ex-situ UPDATES

Central Zoo Authority
केन्द्रीय चिड़ियाघर प्राधिकरण

Ministry of Environment, Forest and Climate Change

The quarterly newsletter of
the Central Zoo Authority, New Delhi

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(October - December 2022)

Theme: Innovation in Enclosure Designing in Zoos

CONTENT

PREVIOUS EDITIONS

Cover Photo Credits:

Penguin: Veermata Jijabai Bhosale Udyan and Zoo, Mumbai, Maharashtra

Satellite Rescue Centre for Leopard: GZRRC, Jamnagar, Gujarat

EDITORIAL BOARD

From the desk of the MEMBER SECRETARY

The zoos have evolved through time in an enormous way from menageries' type to a naturalistic setting. In the past few decades, many zoos have undergone a dramatic role change and reversed their role from recreational centre to the conservation of endangered animal species and centre for conservation education through awareness and outreach among visitor and general public.

Throughout history, wild animals have been kept in trampled iron bar cages for human amusement and enjoyment. In the early 1960's change in public attitude and perception along with a surge of animal rights movement, the zoos were instead considered as cruel prisons controlling and abusing wild animals.

However, cumulative knowledge of animal behaviour, innovative technology, designing, and theming etc. is driving forward the animal welfare in zoos and at the same time also allowing developing nature immersing environment for captive animals and satisfying the visitors experience. Improvements have also been made in animal management techniques with larger more naturalistic enclosures and the development of animal enrichment methods to combat boredom and stereotypic behaviours.

Carl Hagenbeck, in 1907, in his zoo in Hamburg-Stellingen, presented the innovation of animals in open enclosures, in spacious, replica panoramas, thereby sustainably revolutionising zoo architecture. Carl Hagenbeck in 1956, provided a general layout plan of waterways, roads & paths, animal enclosures and sewage system for the National Zoological Park, New Delhi which was amended in the light of local conditions and topography. The Government of India approved this amended plan on 31st December, 1956. This is the beginning of modern zoo designing in India which was otherwise overlooked.

In 1950, Hediger Heini with his book, 'Wild Animals in Captivity' set a benchmark in the theory of zoo design. He pointed to the contradiction between animal behaviour and zoo facilities resulting in deficiency and inadequacy. In 1976 Jones et. al., with their master plan for Woodland Park Zoo, introduced the concept of landscape immersion sustainably influence the zoo architecture. The landscape immersion is to replicate/ recreate the animal habitat as similar as its natural environment and to integrate the visitor within.

The concept of landscape immersion began during the 1970s with a goal to essentially immerse zoo visitors in the habitat of the animals. It is true that the physical and behavioural characteristics of an animal species can be best seen and experienced when viewed in its natural habitat. The planning and designing of the zoo are very important aspects which are composed of space and elements including enclosure designing of the animals along with other services, areas, and buildings required for adequate functioning of any zoo.

In India, zoos have undergone different transformations, from bar-like dingy cages to modern ones. These modern-type zoos are the basis for conservation, education, research, and most important 'Animal welfare'. With time the zoos in India are understanding the need for naturalistic settings for animals and today there are many zoos in India whose animal enclosures are designed and planned with regard to the physical as well as behavioural needs of a species of animals, enhanced visitor experience and the security and safety of animal, visitor and human manpower. These naturalistic enclosures not only provide proper upkeep to the animals but also help in conservation breeding initiatives, education, research, and in achieving various objectives of zoos.

This issue of our newsletter 'ex-situ updates' is themed “Innovation in Enclosure Designing in Zoos” which showcased some of the innovative ways of enclosure designing our Indian zoos are practicing and also a brief about Toronto Zoo, Canada. The issue also includes the experience of Prof. Dr. Rommel Mehta, Architect & Landscape Architect in the field of Zoo Planning and Design Considerations.

With this, we hope that the newsletter acts as a reference and shall encourage our Zoos to continue their efforts in innovative enclosure designing. This issue of our newsletter will motivate our Zoos to work intensively in achieving the major goal of 'Conservation and Animal Welfare' by making the zoos more and more naturalistic for the animals they house.

Dr. Sanjay Kumar Shukla
Member Secretary
Central Zoo Authority

Rigsel (Red Panda)

TRIBUTE

Red panda: Padmaja Naidu Himalayan Zoological Park, Darjeeling, West Bengal

Rigsel was born in 28.05.2007 in Himalayan Zoological Park, Sikkim. She was 3-and-a-half-year-old when she was brought to the zoo on 31st October 2011. Since her parental lineage was different from the pandas housed in zoo, her contribution to the red panda gene pool of PNHZ park as well as conservation breeding program is remarkable.

She introduced new genetic variability by giving birth to one (1) male and three (3) female healthy cubs. She passed away on January 17, 2023 at the age of 15 years and 7 months. She was the oldest living female red panda at the Park.

Her contribution in ex-situ conservation of Red Pandas in Darjeeling Zoo is exceptional Shifu (M) and Yeshe (F), two red pandas born to Rigsel were selected and reintroduced into the wilderness of Singalila National Park in the year 2021 which forwarded the legacy of their mother Rigsel into the wilderness.

WILDLIFE CONSERVATION DAY AND INTERNATIONAL CHEETAH DAY, 2022

NEHRU ZOOLOGICAL PARK, HYDERABAD, TELANGANA

Taken Wildlife Conservation pledge and conducted a rally and awareness programme to the zoo staff and visitors at animal enclosures on Wildlife Conservation Day and International Cheetah Day, 2022 in S V Zoo Park, Tirupati

INDIRA GANDHI ZOOLOGICAL PARK, VISAKHAPATNAM

A pledge for wildlife conservation has been conducted, marking the importance day, on the occasion of World Cheetah Day and Wildlife Conservation Day, 4 December 2022.

CENTRAL ZOO AUTHORITY

Dec 4, 2022
On this #wildlifeconservationday let us take a pledge and be a part of a bigger cause, conservation & protection of the world wildlife and their habitat. #ProPlanetPeople #OneEarth #WildlifeConservation

WILDLIFE CONSERVATION PLEDGE

On this Wildlife conservation Day, I solemnly pledge that I will respect and protect all wildlife and their habitat.

I stand against the crimes committed towards my nation's wildlife and commit to becoming an ethical consumer.

I will spread awareness amongst my peers on the perils of throwaway culture and work on building a sustainable way of life.

I volunteer to the cause of wildlife conservation and promise to support in-situ and ex-situ conservation programs.

I vow, to continue amplifying the message of wildlife conservation and be part of the Pro-Planet community!

Secure Wildlife, Secure Future!
Jai Hind!!

CONSERVE WILDLIFE

WILDLIFE WEEK CELEBRATION 2022

(OCTOBER 2ND TO OCTOBER 8TH)

On the occasion of 68th Wildlife Week (Oct 2-Oct 8) the Central Zoo Authority has organized a series of National level competitions for increasing environmental sustainability awareness amongst the youth.

Wildlife Week Celebration at National Zoological Park, New Delhi

Visits of Member Secretary, CZA

Visit to Agra - Declaration of 12th October as World Sloth Bear Day #WorldSlothBearDay drawing global attention to this lesser-known, native bear species.

Shri Chandra Prakash Goyal, DGF&SS, Shri S.P. Yadav, ADG (PT) & MS, NTCA and Shri S.K. Shukla,MS, CZA visited Nandanvan Zoo & Safari, Chhattisgarh and lauded the efforts of the state forest department and the zoo officials towards the care of captive animals in the zoo

CPSG & WAZA, 2022

Dr Sanjay Shukla, MS - CZA attended the meeting of Animal Conservation Biobanking Specialist Group during CPSG, 2022 in Tenerife, Spain and highlighted the ongoing activities in collaboration with LaCONES. The meeting was presided over by Mr Oliver Ryder

The conference provided an excellent platform for interacting with zoo personnel across the globe and exchange ideas for advancing the science of zoo management.

The ex-situ conservation initiatives and activities of Indian zoos were highlighted during the 4-day conference. During the conference, a visit of the Loro Parque, Tenerife was also organizes

Member Secretary, CZA with his team visited Nehru Zoological Park, Hyderabad, Telanagana

PUBLICATION RELEASE

The "75 flagship species of India" book was released by Shri Chandra Prakash Goyal, DGF & SS, MoEF&CC, Govt. of India

CZA EXPERT TALKS

As part of the 68th Wildlife Week celebrations, the Central Zoo Authority organized a webinar on the theme "Recovering Key species for ecosystem restoration" on 03.10.2022. A talk discussed species extinction rates, conservation measures & landscape connectivity

NEWS FROM ZOOS

India: 'Singham', a two-month-old white tiger released in Maitri Bagh Zoo

You can now adopt an animal at Delhi Zoo. Here are the rates

White tigress Bijaya dies in Nandankanan

A 11-year-old white tigress Bijaya, undergoing treatment at Nandankanan zoo for the last couple of weeks, died on Saturday.

Published: 23rd October 2022 06:58 AM | Last Updated: 23rd October 2022 06:58 AM

By Express News Service

BHUBANESWAR: A 11-year-old white tigress Bijaya, undergoing treatment at Nandankanan zoo for the last couple of weeks, died on Saturday. The zoo authorities said postmortem revealed that there was cancerous growth in around 90 per cent of her lungs, a rare case. The

ENVIRONMENT

Chennai's Arignar Zoo to Get Two Lions From Gujarat Zoo in Exchange of Two White Tigers

The Arignar Zoo in Chennai will soon receive two Asiatic lions from a zoo in Junagadh, Gujarat, in exchange for two white tigers.

The arrival of the two Asiatic lions will lead to the breeding of lions in Arignar Zoo, Vandalur, Chennai.

A female lion will also reach the Arignar Zoo from Lucknow, taking the total number of Lions in the Chennai Zoo to 11.

Kolkata: Chimp Babu celebrates 34th birthday with zoo visitors

TAMAGHNA BANERJEE / TNN / Updated: Oct 27, 2022, 10:08 IST

Babu enjoys his cake made of fruits

70 sambar, spotted deer from Mysuru Zoo to leave for Dandeli

LAWRENCE MILTON / TNN / Updated: Nov 19, 2022, 13:01 IST

Sambar and spotted deer from Mysuru Zoo will be filmed to their new home in Dandeli in Uttara Kannada district in specially designed enclosures.

MYSURU: Buoyed by the success of the release of spotted deer and sambar deer from Mysuru zoo to a wildlife sanctuary, the authorities are planning to relocate another batch of deer into a tiger reserve in northern Karnataka.

For genetic variety, Delhi zoo plans exchange of animals

NEW DELHI: To increase species diversity and maintain its diverse genetic pool, the Delhi zoo plans to bring in more herbivores, including sika or Japanese deer. The last Japanese deer in the zoo was killed by feral dogs in November. According to zoo officials, more chinkaras or Indian gazelles will also be brought.

Binkadkatti Zoo in Gadag welcomes two Asiatic lions

BASAVARAJ KATTIMANI / TNN / basavaraj.kattimani@timesgroup.com / Updated: Dec 17, 2022, 11:45 IST

GADAG: The Gadag zoo, also called Binkadkatti Zoo, is all set to become a tourist attraction in North Karnataka as it has accorded a red-carpet welcome to two Asiatic lions

Indian zoos: seeds of wildlife conservation

Zoos have been the catalysts for many career conservationists; they nurture endangered species and offer green spaces for a nominal fee

December 07, 2022 11:21 am | Updated 11:47 am IST

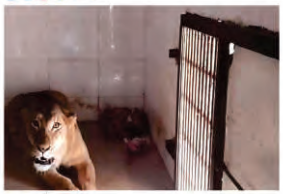
ZAI WHITAKER

COMMENTS SHARE READ LATER

Children feed animals at The Madras Crocodile Bank Trust and Centre for Herpetology | Photo Credit: Special Arrangement

I'll start with a quote from my bestie Jane Goodall (whom I've never met, of course). Her

MP: Lioness give birth to 3 cubs in Gwalior zoo



Lioness brought from Lucknow to be shifted to exhibit area at Vandalur zoo

P OPPILI / TNN / oppili.p@timesgroup.com / Updated: Dec 25, 2022, 06:38 IST

The lioness will be in quarantine for 21 days at Vandalur

CHENNAI: A four-and-half year old lioness from Nawab Wajid Ali Shah Zoological Garden in Lucknow is now at its new home in Vandalur zoo. The lioness was exchanged for a white tigress.

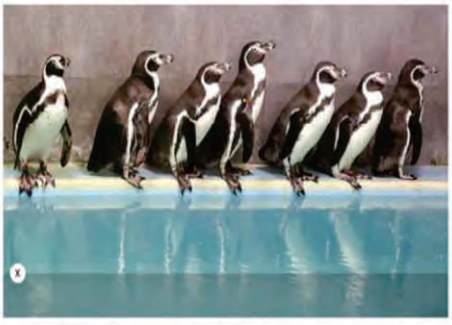
Mumbai zoo welcomes three new penguins

Meanwhile, in another major development, the Brihanmumbai Municipal Corporation (BMC) announced that booking tickets for entering the zoo could now be made online.

By: Express News Service

Mumbai | Updated: November 24, 2022 17:32 IST

NewsGuard



In July 2016, the civic body had acquired three male and five female penguins from Seoul in South Korea. (Representational/File)

The civic administration of Veermata Jijabai Bhosale Udyan and Zoo, popularly known as Ranibaugh, on Friday announced that the zoo has welcomed three new Humboldt Penguins. The zoo, which is set to celebrate its 160th anniversary on Saturday (November 19), is home to 12 penguins at present.

With 50,000 visitors in Dec, over 5 lakh visited Rajkot zoo this fiscal

Overall, 5,36,963 visitors visited the park till end of December, generating Rs1.40 crore revenue for the civic body.

By: Express News Service

Rajkot | Updated: January 3, 2023 04:18 IST

NewsGuard

As many as 53,086 visitors visited the Rajkot zoo during the last month of calendar year 2022.

WITH OVER 53,000 people visiting the Rajkot Zoological Park (RZP), popularly known as the Pradyuman Park, in December, the total number of visitors so far this

Three tiger cubs on display at Mysuru zoo

The public viewing of the cubs born to Tara, a white tigress, and Rockey, was inaugurated on December 24 by Minister in-charge of Mysuru district S.T. Somashekar

THE HINDU BUREAU

COMMENTS SHARE READ LATER

Surat zoo makes special arrangements to keep animals warm

ANI 31 December, 2022 01:24 am IST

A lioness at the Sarthana Nature Park and Zoo in Surat (Photo/ANI)

Hyderabad: Zoo celebrates 68th 'Vanya Prani Saptah'

The Hans India

Hans News Service | 7 Oct 2022 1:00 AM IST

HIGHLIGHTS

The 68th 'Vanya Prani Saptah' and 59th 'Zoo Day' were celebrated on Thursday at Nehru Zoological Park. On this occasion, a pair of Meerkats and a pair of white eared Marmoset were released into the enclosure for public display at the small cat enclosure by the zoo officials.

You Can Now Adopt Your Favourite Animal At Delhi Zoo: Know How And What The Rates Are

3 min read 62 Shares

Gursharan Bhalla

Updated on Oct 05, 2022, 13:10 IST

Highlights

- After getting the membership card, the adopter will be allowed to enter the zoo during visiting hours once every month upon showing the card.
- The starting range for adopting birds can be from Rs. 700 and Rs 6,00,000 for lions, tigers, rhinos and elephants while the cost for adopting leopards is Rs. 3,60,000 per year.

Under the animal adoption scheme which offers animal lovers to participate in wildlife conservation, the National Zoological Park (Delhi Zoo) WILL allow people to sign up to pay for the care of animals at the facility.

Zoo director Dharam Deo Rai said that the scheme is being introduced for the first time at the zoo and is meant "to encourage the participation of people in wildlife conservation".

Three new attractions added to Nehru Zoological Park in Hyderabad

The zoo, which is known as the leading zoological park in the country, has completed 59 years and has stepped into its 60th year.

Published: 07th October 2022 03:43 AM | Last Updated: 07th October 2022 03:43 AM

A pair of meerkats on display at the Nehru Zoological Park in Hyderabad on Thursday

By Express News Service

HYDERABAD: The Nehru Zoological Park in Hyderabad, which turned 60 on Thursday, added three more attractions. These include Meerkat, Marmoset enclosures and an open fish pond with different types of fish in the pond.

Heaters & straw beds to keep Patna zoo inmates warm

FARYAL RUMI / TNN / Updated: Dec 1, 2022, 07:20 IST

A fishing cat inside a wooden cage at Patna zoo on Wednesday

PATNA: The Sanjay Gandhi Biological Park, commonly known as Patna zoo, has made special arrangements for different species of wild animals, birds and reptiles to keep them cozy and warm this winter season.

A 60-acre of urban green space, Byculla zoo is a result of planning that took shape 160 years ago

The existence of a zoo inside a botanical park is also a testament to Mumbai's age-old culture of being an egalitarian society, despite being a power centre during British rule in India.

Written by Eeshanpriya MS Follow

Mumbai | Updated: December 7, 2022 15:02 IST

NewsGuard

The zoo was established in 1962 almost three decades after the gardens were set up. Amit Chakravarty

WORKSHOPS AND CONFERENCES

Capacity building workshop for Zoo Biologists 23rd to 25th November, 2022 at Hyderabad

SWACHH BHARAT 2022

On the occasion of the Gandhi Jayanti, the Swachh Bharat 2022 vision was honoured and the office of the CZA has taken steps towards making workspaces #ClutterFree. #SpecialCampaign 2.0 #SwachhBharatDiwas2022

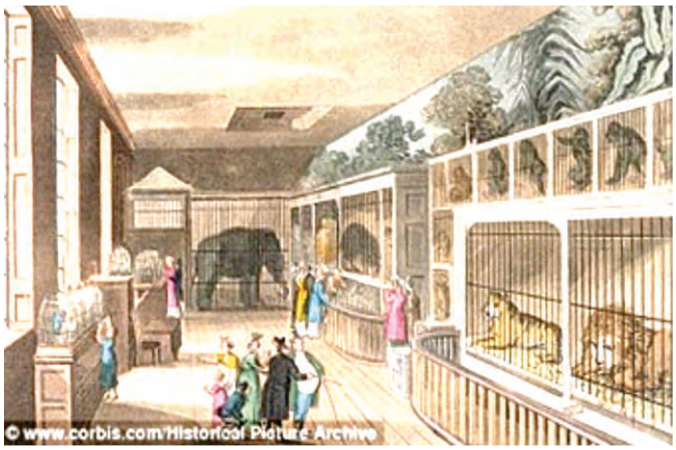
75 years of Enclosure Designing in Indian Zoos

Natasha S Vashisth, TA, CZA
Dr. Devender Kumar, EMO, CZA

Zoos all over the world have evolved over the centuries and have witnessed various changes in terms of their objectives, animal collection as well as exhibit types. In India, the zoos have evolved from menageries/cage type to a naturalistic innovative enclosure for the animals since early 1800's. All these changes took place as a result of the evolution of man animal relationship. Animal enclosure planning and designing was started in the last 200 years by the patron rulers. However, in the recent 100 years the concept of enclosure designing has been evolved through the knowledge and experience of many foresters, wildlife experts and researchers.

At a global level the zoo has been evolved through three phases which includes- Zoos designed as Confinements (during 18th & 19th century), Modernisation of Zoos (during early 20th century) and Zoos designed as Conservation and Education Facilities (during late 20th century).

In India, the zoos were merely a private collection of animals housed in cages by kings/rulers of the princely state and were exhibited for the entertainment purpose to the public. The first zoo in India for public viewing was established in 1801 at Barrackpore. Other zoos were also established by the kings and rulers in their princely states. All these zoos were having animals housed in small cages with bars and wires.



In India during the 19th century, the concept of zoo evolved significantly with respect to the functioning and housing of animals in the zoo. In the early 1900s, the animals were kept in small cage-like enclosures with fences, welded mesh or iron bars as barriers. During the mid 1900s, the Government of India (post independence) acknowledged zoos as a 'Center for Wildlife Conservation' and introduced modern zoo concepts with naturalistic enclosures for animals. These naturalistic enclosures mimic the natural habitat conditions of the animals in zoos. In the 1900s, the Central Zoo Authority was established and prescribed norms for the development and functioning of the zoos in India. With this, further advancement in the designing and planning of the animal enclosure flourished and the zoos started understanding the zoo design philosophies, concept of immersion design techniques, cultural immersions, viewing point of animals and visitor accommodation, requirement of species specific exhibit design and enrichment etc.

Today the zoos have to prove their existence by the way of its animal exhibits, its conservation education and conservation breeding initiatives. The success of the zoos is achieved not by the quantity of its exhibits but by the qualitative exhibits. In India, many zoos have evolved with time and are having naturalistic enclosures, moated enclosures, glass viewing enclosures, open, management friendly, visitor friendly as well as animal friendly enclosures.The scenario of the Indian zoos with regard to the enclosure designing over the last 75 years depicts how the zoos in our country evolved from time to time and are achieving the main objectives of Animal welfare, Conservation and Education.

Innovations In Zoo Designing

Enclosure Design in Leopard Rescue Facility of Greens Zoological Rescue & Rehabilitation Centre, Jamnagar, Gujarat

Vivaan Karani, CEO, Brij Kishor Gupta, Director,
Akshaya Maane, Chief Biologist, Sitendu Goswami, Compliance Officer & Prudhvi Raj, Compliance Officer

Introduction

Modern zoological institutions are no longer shackled by the dogma that defined them as facilities displaying animals for public viewing. Instead, zoos have evolved as modern conservation-oriented institutions that foster a sense of stewardship for biodiversity in visitors. To serve these goals, zoos and rescue centres should be designed so that they serve their respective societal roles for the animals housed as well as the visitors. Greens Zoological Rescue and Rehabilitation Centre (GZRRC) was founded with the objective to conserve global biological diversity, while catering to the welfare requirement of captive animals. GZRRC constituted a team of prominent zoo-biologists, who worked in close consonance with internationally acclaimed zoo-design firms to create enclosures and facilities to realize its short-term and long-term goals.

Greens Zoological Rescue and Rehabilitation Centre is cognizant of its responsibilities to the society and is guided by the principles of biodiversity conservation across all its activities. GZRRC aims to be one of the premier institutions in the field of conservation science by creating conservation-oriented infrastructure that caters to all stakeholders in our quest to conserve global biodiversity. Most zoo designers struggle to provide a usable captive habitat for animals, where they can express species-typical behaviour patterns. Modern enclosure design philosophy aims to create several opportunities for animals to experience species-

typical multi-sensory inputs (Clarke 2009). Animal welfare research frequently underlines the importance of the synergistic relationship between enclosure design and animal husbandry practices which together assists in providing optimum welfare to animals (Goswami et al. 2020). In this article, we will discuss some of the salient features of one leopard enclosure at GZRRC as a microcosm for our design ethos and conservation philosophy. This article will also highlight how the enclosure design of GZRRC is complemented by its trained animal management staff's efficient husbandry practices.

Overview of the Leopard Rescue and Rehabilitation Centre of GZRRC

The leopard rescue centre of Greens Zoological Rescue and Rehabilitation Centre is spread across an area of 24 acres and caters to the housing care and welfare of rescued leopards. This facility is designed for the welfare and long-term care of these rescued animals, but unlike most other commonly found rescue centres in the country, the enclosure design of the GZRRC facility stands out for its species oriented enclosure design. All enclosures at the leopard rescue facility apart from catering to the welfare of the rescued animals also aim to create several opportunities to express species-typical behaviours. Recent studies on the welfare of captive carnivores at Indian zoos show that enclosure complexity is one of the most significant contributors to the welfare of animals and has the ability offset the effect of visitor presence under certain circumstances (Estep, Fischer, and Gore 1978; Mallapur, Qureshi, and Chellam 2002; Goswami et al. 2023; Jensvold et al. 2001). Enclosure complexity and species-appropriateness are the guiding principles for the enclosure design at the GZRRC leopard rescue facility. Studies have shown that a complex enclosure increases the species-typical activity and reduces stereotypy in animals housed (Healy, Marples, et al. 2000).

Rescue and rehabilitation of animals is one of the primary objectives of Indian zoos as highlighted in the National Zoo Policy (1998). Greens Zoological Rescue and Rehabilitation Centre was founded on the principles of animal welfare and biodiversity conservation. Our core principles, reflect in the design philosophy of all enclosures and husbandry practices. The history of modern human civilization bears witness to the large-scale socio-economic upheavals marked by global changes in land-use patterns, causing habitat loss for several species of wildlife and an exponential increase in man animal conflict (Malviya and Ramesh 2015). Since the last few decades, the amount of conflict faced by the urban and semi-urban centers have spiralled to unprecedented levels (Inskip and Zimmermann 2009; Anand and Radhakrishna 2017). Increase in captive leopard population at Indian zoos because of man-animal conflict is a matter of concern. As the population of captive rescued leopards rises, Indian zoos are faced with significant strain on their limited off-display housing and human resources to care for these animals. Greens Zoological Rescue and Rehabilitation Centre, Jamnagar has a core objective to decongest Indian zoos by providing long-term welfare centric housing to animals rescued as a part of man-animal conflict. The GZRRC satellite leopard rescue facility provides one of the finest housing and captive management facilities for leopards that is unparalleled and peerless in its design and functionality. The leopard rescue facility has been operational since 2020 and continues to care for rescued leopards using novel husbandry and management practices. GZRRC uses a holistic approach to enclosure design and species management at its facility. In this regard, our modern enclosures are complemented by a highly trained group of Animal keepers, Biologists and Veterinarians who work together to cater the health and welfare requirements of everyone under our care.

Salient features of the enclosure design at the leopard rescue facility

Indian zoos have one of the largest captive populations of leopards and yet our understanding about the behavioural ecology of leopards remains limited to mostly field based studies. The off-display rescue facility for leopards at the GZRRC provides a unique advantage to further our knowledge about the captive biology and the behaviour patterns of rescued leopards. The enclosures are designed to encourage natural behaviours in leopards while allowing for disturbance free observation by keepers and biologists through remote and passive monitoring systems. According to Gupta (2008), enclosures should be designed to be safe for animals as well as the people who take care of them. Hence, safety of keepers and animals is of utmost importance and reflects in all aspects of the enclosure design. The enclosure barrier is made with 304 grade stainless steel mesh which is complemented by hedges as a stand-off barrier. Observation areas have one-way viewing glass that reduces the amount of glare and allows keepers,

biologists, and veterinarians to observe animals without causing unnecessary disturbance.

There are four interconnected paddock areas. Each enclosure has two-night cells measuring 6.35m (length) x 6.3m(width) x 3m(height). The indoor areas are made from ferro cement and wood that act as good substitutes for natural substrates and provide a good balance between natural stimulation and effective sanitization practices. Four leopard enclosures are interconnected by two overhead wire-mesh tunnels suspended at 14ft or 3m from the ground, that allow leopards to move freely between the four enclosures. The enclosures are top covered with 304 grade stainless steel wire mesh with height of 4m which allows for the provision of climbing furniture and elevated pathways.

Landscape

Most zoo enclosures for carnivores are limited in terms of their landscape design. In the natural habitat, carnivores, especially leopards, encounter a diverse terrain feature, which may include different substrates, water bodies, rocky outcrops, stones, hills, and mounds. The landscape of each leopard enclosure pays meticulous attention to the behavioural requirement of the leopards while interacting with the enclosures. Since the leopard enclosures are top covered to prevent chances of accidental escape, there is a chance of heat getting trapped in the same throughout the daylight hours. The wire mesh used in the leopard enclosure has a special reflective coating on the outer surface so that it reflects most of the radiated heat and prevents the temperature inside the enclosure from increasing. Additionally, the wire-mesh at the upper parts of the enclosure have wider openings for better airflow along with a provision for overhead sprinklers. Sensors are provided at various parts of the enclosure that take one reading every minute and if there is a hotspot developing at certain parts of the enclosure, the designated sprinkler in that zone turns on automatically. The water sprinkling system is designed to regulate the amount of water sprinkled based on the humidity levels inside the enclosure. By using this system, the water consumption levels of the enclosure have been optimized.

Barrier design

The primary enclosure barrier at the leopard enclosure is stainless steel wire mesh, which is complemented by hedges on the inner side of the enclosure. Certain areas of the enclosure are designated as observation points because they provide an unhindered view of the enclosure; these areas have one-way viewing glass as the primary barrier. Keepers, biologists, and veterinarians use these areas to observe animals and mitigate the observer effect McDougall (2012). Therefore, the barrier at the facility serves not only to prevent animal extrusion but also helps maintain the thermal gradients of the enclosure so that the animals can thermoregulate effectively. The enclosure barrier design at this facility is highly functional and caters to the welfare requirement of the species housed in the same.

Special Enclosure Features

In this section we discuss some of the prominent enclosure features of the leopard rescue facility that sets it apart. GZRRC uses cutting-edge technology to cater to the welfare needs of rescued leopards. Modern technology in-grained with welfare oriented design principles and a modern husbandry practice, are the key tenets for captive animal husbandry and management at the GZRRC.

Water sprinkler system

The enclosure is integrated with a multi-sensory system that logs the temperature and humidity levels of the enclosure periodically. Sensors are provided at various parts of the enclosure that take one reading every minute and if there is a hotspot developing at certain parts of the enclosure, the designated sprinkler in that zone turns on automatically. This allows for the expression of natural behaviours in the leopards and also promotes vegetation growth. The water sprinkling system is designed to regulate the amount of water sprinkled based on the humidity levels inside the enclosure. By using this system, the water consumption of the enclosures has been optimized. Additionally, the wire-mesh at the upper parts of the enclosure have wider openings for better airflow along with a provision for overhead sprinklers. The water sprinkling system is designed to regulate the amount of water sprinkled based on the humidity levels inside the enclosure. By using this system, the water consumption levels of the enclosure have been optimized.

Artificial Intelligence (AI) for security sensors glass

Safety and security of the animals and the personnel is one of the primary enclosure design features that resonates across the GZRRC. The enclosure is embedded with several sensors that prevent intrusion as well as extrusion. Artificial intelligence based face recognition devices are placed at all entry points to the facility as well as the night cells, so that only authorized personnel can gain entry. Additionally, sensors are installed at strategic locations of the enclosure barrier to ensure that an alert is issued as soon as there is an animal escape. All these modern, digital, AI based technologies help us ensure the safety and security of personnel and the animals.

Face recognition device (security features)

Movement of personnel across several enclosures has serious security, health, and safety repercussions. Hence the GZRRC has installed and implemented a site wide, AI based face recognition based access interface. Using this only authorized personnel can gain entry into their respective areas of operation. This mitigates disease transmissions and effectively reduces the risk of biosecurity breach.

3600 Overhead Tunnel

One of the unique features of the leopard holding facility is an innovative 3600 tunnel that connects four enclosures and crosses over one another. ***"Leopards are solitary animals and do not like the company of their conspecifics",*** our enclosure design puts to test one of the most prevalent dogmas of animal behaviour that has percolated into zoo biology as well as modern captive animal management. Four enclosures at our rescue facility house 16 leopards (8:8:0:16), all sub-adults. These four enclosures have an overlapping 360-degree overhead walkway design that offers leopards the choice to utilize two enclosures or use the hanging overhead tunnel to view areas beyond the enclosures. These walkways are designed to provide an unrestricted view of the surrounding landscape to the leopards and provide them a sense of control. This enclosure design, while innovative, also provides an unprecedented opportunity for biologists to observe and understand the social dynamics of sub-adult leopards housed in iso-sexual groups.

Vegetation at the enclosure

A functional captive habitat needs to be complemented with diverse species-typical vegetation that mimics nature and promotes the expression of species-typical behaviours. Most enclosures at Indian zoos are lacking in terms of a diverse vegetation design and distribution. The GZRRC has given special attention to the vegetation inside each enclosure, the leopard enclosure has more than 145 species of shrubs, herbs and grasses that are planted at various areas to promote natural behaviours like stalking, resting, playing and other prosocial behaviours. The vegetation inside the enclosure, especially trees, are linked with enrichment interventions. The keepers are trained to incorporate enrichment interventions such as sensory and manipulable enrichment with the vegetation to make the enclosures more functional for the animals. Keepers and biologists also collect regular samples to check for ectoparasites, on a weekly basis so that the vegetation inside the enclosure does not promote disease transmission.

Night-house design

Night cells at most Indian zoos seldom account for keeper safety in their enclosure design and management practices. In contrast, animal caretaker safety is at the core of the enclosure design principles at the GZRRC. The keeper gallery at the facility is 3m wide and provides sufficient space to care for the animals without risking injury. The keeper gallery has a separate room for remote monitoring of animals. Separate rooms are provided for food processing which reduces contamination during food distribution. Special attention is given to provide multiple enrichment opportunities to animals throughout the day, which includes the retiring cells. The night cells and paddock areas are equipped with CCTV monitoring system that allow 24x7 remote monitoring of animals. The night cells are designed to provide optimal spaces for the expression of species-typical behaviours. Each night cell is equipped with ledges and climbing structures as well as vantage points that allow leopards to perch naturally. Additionally, the night cells are equipped with multi-sensory enrichment devices that promote the expression of species-typical behaviours. The night cells are equipped with remote monitoring systems like night vision cameras and bio-fencing. These systems allow keepers to remotely monitor all night-cells without disturbing animals, while preventing chances of accidental animal escape or intrusions by alerting the security personnel. Strong odours and poor ventilation are one of common problems in night house design for most enclosures in Indian zoos. At GZRRC, all night houses have a high-power Heating ventilation and Air Condition (HVAC) system that works on a 24x7 power backup from renewable resources. The animals are provided with a temperature controlled living and resting space that is both sanitized and free from airborne pathogens.

Food chute and auto-filling water bowls

Keeper safety and animal welfare are two primary objectives of the design ethos at the GZRRC. Keepers are trained to practice all safety and security protocols while performing all aspects of their duties, especially when they are in close-contact with animals. Feeding large carnivores is a complicated task and mandates adherence to health and safety protocols. To ensure the safety of keepers and prevent contamination, food chutes have been placed at each retiring cell, which allows keepers to deliver the food to animals in a safe and hygienic manner. Auto-filling water bowls work on a simple mechanical design that fills up as soon the bowls are 70% empty. This prevents water wastage and allows animals to drink based on their physiological needs.

Squeeze cage tunnel

Squeeze cages are often necessary to conduct routine health examinations, apply prophylactic medications and perform other husbandry practices. However, squeeze cages elicit a lot of negative behavioural feedback from most zoo-housed animals. This results in a high incidence of injuries while coaxing animals to voluntarily move inside the squeeze cage. At the leopard enclosure, squeeze cages are placed between the doors of the night cell that opens to the paddock area, therefore the animals get habituated to the confines of squeeze cages every day. The keepers and veterinarians can also conduct quick ocular checks on the body condition, coat condition and the health status of the animals every day, due to this design feature.

Physiological measurements are crucial to captive management of animals. At GZRRC, diets and nutritional supplements for animals are adjusted regularly based on the body weight and physiological condition of the animals. All enclosures are equipped with weighing scales near the squeeze cage tunnel, which allows keepers to maintain daily records of weight of animals, which is used by our nutritionist veterinarians to measure the diet. Accurate weight information is also necessary to accurately deliver prophylactic treatments and detect physiological ailments before other symptoms arise.

Night house enrichment

Leopards housed at the rescue facility have the choice to spend their time at the retiring cells or at the paddock area. Hence the retiring cells or night houses should have the same level of opportunities as the paddock for animals to express natural behaviour patterns. Several natural perches and elevated platforms are placed at multiple areas of the retiring cell, where the leopards can consume large pieces of bones for prolonged durations. Increasing the amount of food processing time is an excellent way to reduce boredom and stimulate captive animals to express species-typical behaviours. Tactile rubbing posts, scratching posts and other multi-sensory enrichment tools are placed at each leopard enclosure. The enrichment devices are designed to target a set of unique behavioural traits that lead to the expression of unique species-typical behaviours.

Animal caretakers and zoo biologists regularly monitor the reaction of a leopard to particular enrichment and readjust their enrichment strategy to meet the welfare goals based on the welfare parameter objectives.

Animal welfare is a primary objective of the GZRRC and that reflects across all aspects of enclosure design and management practices. The enclosure at the leopard rescue facility is designed to provide sufficient opportunities for leopards to express species-typical behaviour patterns. Several enrichment features have been incorporated into the enclosure design which cater to the welfare requirement of leopards.

Leopards are cognitively diverse generalists, hence need constant challenges to mitigate boredom and

prevent displacement behaviours. The leopard enclosures allow them to express a full gamut of behavioural repertoire and instinctive behaviours which not only ensures welfare but opens opportunities to experience positive affect.

Hence keepers are encouraged to incorporate cognitively challenging enrichment for leopards. All enclosures have water ponds with variable depths that increase the complexity of the enclosure and mimic the natural environment. Leopards are among the most ubiquitous large carnivores found in the Indian subcontinent. Their natural behaviour repertoire consists of interacting with their habitat in multifarious ways, hence our enclosures are designed to provide similar opportunities to the animals and create sufficient chances for expression of species-typical behavioural repertoires. The enclosures are designed to increase the aesthetic and functional value of the captive habitat for the animals housed in them. The water ponds are further enhanced by the addition of a simulated waterfall which allows leopards to interact with their captive habitat in various ways. Leopards, like most large carnivores, prefer to rest on elevated perches that allow them to have a vantage point. Several such opportunities are made available to animals at the leopard rescue facility. Apart from elevated perches, the leopards have access to arboreal walkways that allow them to use their special climbing skills and access different parts of the enclosure.

Husbandry practices

Any modern enclosure should be designed while keeping in mind all stakeholders viz.,

1. The animal is housed in the facility.
2. The keeper takes care of the animals inside the facility.

Central Viewing gallery

The keepers have strategic viewing access to all parts of the enclosure allowing them to monitor the animals without causing unnecessary disturbance. The keeper gallery is specially designed to provide adequate space to the keepers for tailoring the daily feed of individual animals. Keeper convenience and safety is given utmost importance on each aspect of enclosure design. The GZRRC is a fully digitized facility with an emphasis on a fully integrated software based behavioural monitoring and species management system. Our animal keepers are trained to use the TRACKs software management system and input behavioural data for individual observations regularly which is monitored by biologists and veterinarians for further analysis and assessment. The GZRRC implements a welfare-centric husbandry and management program that is focused on minimizing the stress associated with daily husbandry practices. Animals housed at our facility are trained using positive reinforcement conditioning so that they volunteer for daily checks, which include oral cavity check, blood draws and prophylactic interventions.

Feeding practices

Leopards housed at the rescue facility are fed once a day with one fast day every week. The daily diet of leopards varies between 4-6 kg of meat with bones along with the necessary supplements. The diet is tailored to meet individual requirements, so that the meat is provided as uncut pieces along with bones and hide to promote natural food processing behaviours. A special food chute has been installed at each retiring cell that allows keepers to provision the food without having to physically enter the enclosure. All night houses have auto-filling water bowls that supply clean water. The floor of the retiring cells has a slight slope towards the keeper gallery to aid in the cleaning of the cells. Apart from the daily ration, the leopards are provided with supplemental feed based enrichment items like buffalo tail and dressed chicken that allow them to express species-typical behaviours.

Social grouping of animals

Common misconceptions about solitary-living animals often percolate into captive biology. Leopards at Indian zoos are often housed singly or in pairs, which inevitably leads to agonistic interactions due to improper management practices. At GZRRC, subadult and adult leopards are socialized gradually before they are released in the same enclosure. Post-release occupancy studies are conducted to understand the space usage patterns and the social-affiliative behaviours of the animals for three to six months. In this regard, we have found that the rescued leopards are able to live in harmony with minimal agonistic interactions if the management practices are designed to meet the individual requirement of the species.

Welfare outcomes

As per recent literature on enclosure design, enclosures should be designed to meet species-specific requirements, but they should be tailored to meet individual welfare requirements (Wolfensohn et al. 2018; Goswami et al. 2020). The leopard

enclosure at the GZRRC rescue facility has been designed to provide a multi-layered gamut of sensory inputs that not only provides an optimized level of welfare, but also promotes chances for experiencing positive affective states in rescued leopards. Since the rescued leopards have been transferred to the GZRRC rescue facility, we have noticed significant improvements in the level of species-typical behaviours shown by the animals. The GZRRC has an experienced team of animal-keepers, zoo-biologists and veterinarians that regularly monitor the behavioural and physiological correlates of welfare and make necessary changes to the husbandry practices to promote the expression of species-typical behaviours. Additionally, the keepers are trained to look out for displacement behaviours and record the same in pre-formatted data sheets, which are then analysed by biologists to identify preliminary symptoms of stereotypy in individuals. The enclosures at the GZRRC are designed to mimic natural habitats that are ever changing and mutating along with the seasons. These enclosures can be modified based on the unique species-typical requirements and provide animals with the necessary multi-sensory inputs required to express a species-typical behaviour repertoire and experience positive affective states. We discovered that since the leopards arrived at our facility, their body condition scores improved which was followed by an improvement in the physiological and behavioural markers of chronic stress. This is indicative of the fact that the enclosure design at the GZRRC caters to the welfare requirement of leopards. We hope that some of the salient design features mentioned in this article, diffuse into modern enclosure designs at Indian zoos, which will aid in the long-term welfare and health of animals housed in them.

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Asiatic Lion enclosure at Sri Sayajibaug Zoo Vadodara, Gujarat

Sri Sayajibaug Zoo, Vadodara, Gujarat

Lion symbolises strength and courage. Being the only social cat in the world, Lion is honoured as the 'King of Beasts'. Of the two sub-species of lions extant today, the Asiatic Lion is the Pride of India. This majestic wild cat is endemic to the Gir Forest of Gujarat and holds the status of "State Animal" of Gujarat. Asiatic Lion is an integral part of the rich cultural heritage of India. Listed in the 'Critically Endangered' category by IUCN, the Asiatic Lion is a species of Global Importance. In the current times, Asiatic Lions are a priced possession in the collection of any of the zoos across the world. In the Indian scenario Asiatic Lion is a species of conservation importance and therefore it is essential that the species is finely exhibited to the Zoo Visitors.

The newly constructed enclosure of Asiatic Lion at Sri Sayajibaug Zoo, Vadodara is a part of the section named 'Wild Gujarat' wherein the major wildlife of Gujarat is planned to be showcased. While planning this entire section, prime importance was given to the Asiatic Lion Enclosure. The enclosure is Dry V-Moat Enclosure, spread over an area of 2200 sq. m. The enclosure was so thoughtfully designed that the existing large Banyan trees on the site and other dry deciduous tree species like Indian Laburnum were encompassed in to the paddock area. These large trees, naturally growing shrubs and grasses and created landscapes give visitors a picture of Gir Ecosystem. The paddock area is further enriched with other plantation and elements like tree logs and wooden platforms are incorporated which further enhances the enrichment. The construction of retiring cells, the back and sides of the enclosures was largely done using stone masonry, in addition to that the stone cladding work was used to hide the concrete beneath. The rubble masonry and cladding gives a unique and aesthetic look to the enclosure and is

very appealing to a visitor's eye. The retiring cells are also spacious enough for the animals to move freely and relax. Attached to the retiring cells on both the extremities are two Open Air Kraals with natural vegetation and enrichments. The wooden platforms provided in the paddock area for the animals as a part of enrichment not only provide high raised resting and vantage points to the animals but also serve as good viewing for the visitors. The enclosure was opened for the visitors on 1st December 2020 and the Lions housed in are enjoying their comfort in a well-planned naturalistic environment.

Explore the Birds Paradise at M.C. Zoological Park, Chhatbir, Punjab "Chhatbir-Bird-Park" (Walk-In Aviary)

M.C. Zoological Park, Chhatbir, Punjab

The country's only display of its sort is the walk-in aviary in M.C. Zoological Park, Chhatbir, Punjab for domestic and exotic birds. The aviary comprises a total of 5 exhibits which are associated with different themes. The walk-in aviary features a variety of landscape features to heighten the attractiveness of the exhibits and water bodies, including meandering water channels with wooden boardwalks, paved paths, and various types of galleries and railings according to the themes. Each exhibit has a unique entrance and exit. The architecture of the Chhatbir Zoo Walk-in Aviary has been made in such a way that the visitors can enjoy the following five theme-based exhibits connected with interpretative galleries in a sequential manner.

To provide perches and hiding places for the birds housed, hundreds of carefully chosen plants have been placed in addition to the existing landscape. The birds can use the nest boxes and feeding stations which are made available in sufficient numbers. A variety of arboreal, terrestrial, and aquatic birds live in the aviary. A visitor's delight is seeing the birds soaring freely overhead.

Terrestrial:-

The Terrestrial exhibit has predominantly Terrestrial Birds such as Rose Ringed Parakeet, Alexandrine Parakeet, Cattle Egret, Little Egret, Eurasian Spoonbill, Eurasian Collared Dove, White Ibis, White Breasted Water hen, Common Moorhen, Indian Pond Heron and Night Heron.

Rock & Duck:-

This section of the Walk-in Aviary consists of aquatic birds including Migratory Ducks such as Spot-Billed Duck, Comb Duck, Black Swan and Lesser Whistling Duck.

Woodland:-

The Woodland exhibit has a beautiful pair of Sarus Cranes with Jungle Bush Quail, Black Partridge and Common house sparrow. In addition to that, a Mini Aviary has been created for the exotic species like Diamond Dove, Grey Cockatiel, Zebra Finches, Budgerigar and Java Sparrow.

Japanese Trail:-

This exhibit has a beautiful young pair of Sarus Cranes along with Jungle Babbler, Red Jungle Fowl, Tree Pie, Red Wattled Lapwing and Indian Grey Partridge.

Rainforest:-

This design, which is the largest of the exhibits, features a sizable waterfall facility with an artificial raining system to mimic the environment of the rainforest Ecosystem. It accommodates Painted Stork, Rosy Pelican, Grey Pelican, White Stork, Woolly-Necked Stork and Black Necked Stork.

Flightless trail:-

A wide and open exhibit specially dedicated to Ostrich, Emu, Cassowary and Rhea. The path, which leads to the rope way hanging bridge, is built on a hardwood floor pattern fastened with a safety barrier made of iron and bamboo rope. In this exhibition, emus and ostriches are now on display.

Red Panda enclosures at Padmaja Naidu Himalayan Zoological Park, Darjeeling

Padmaja Naidu Himalayan Zoological Park, Darjeeling, West Bengal

Introduction:

The Red Panda *(Ailurus fulgens fulgens)* is a small lesser carnivore species of the Eastern Himalayas and is well known for being the only living member of the family Ailuridae. The species is very small and weighs only about 4 to 5 kg, they are highly arboreal animals and excellent climbers because of the presence of pseudo thumb. They are found in the temperate forests of the Eastern Himalayan region at an altitude between 2,200m to 4,800m. The housing of these unique animals in captivity is designed keeping in mind their natural behavior and ecology in the wild.

Enclosure & Enrichment at Padmaja Naidu Himalayan Zoological Park:

The Red Panda Conservation Breeding Project at Padmaja Naidu Himalayan Zoological Park, Darjeeling started in the early 90's and is one of the most successful and only breeding programmes for the species in its natural distribution zone. To ensure the successful breeding of this species the park has constructed a separate conservation breeding centre. 5 hectares of land in Topkedara block under Senchal Wildlife Sanctuary was handed over to Padmaja Naidu Himalayan Zoological Park for the construction of the off-display Conservation Breeding Centre for Snow leopards (Uncia uncia) and Red Panda (Ailurus fulgens). The new off-display Conservation Breeding Centre for Snow leopard and Red Panda at Topkedara funded by the Govt. of West Bengal and Central Zoo Authority, MoEF was inaugurated on 08.10.2013 by the Honourable Minister in Charge (Forest) Shri. Hiten Barman along with North Bengal Development Minister Shri. Gautam Deb. The centre currently has 6 open enclosures for the red panda. Currently the park has 3 open enclosures for display and the old conservation breeding centre has 2 open enclosures.

Enclosure design:

The red panda is a crepuscular, arboreal, and solitary animal. The enclosures for red pandas at PNHZ Park have been designed with careful consideration so that the enclosures meet the physical, social, behavioural, and psychological needs of the species keeping in mind their natural ecology.

The 3 open enclosures at the zoo for display are oval shaped and the size of individual enclosures are as follows: left side: 15.00m, right side: 33.0m, and width: 32.0m. The first enclosure includes one keeper's gallery with dimensions of 2.10m X 2.20m and a night shelter for the animal with dimensions of 2.15m X 2.20m. The size of the keeper's gallery at the twin enclosure is 3.10m X 2.10m and the night shelter is of the same size as the first enclosure.

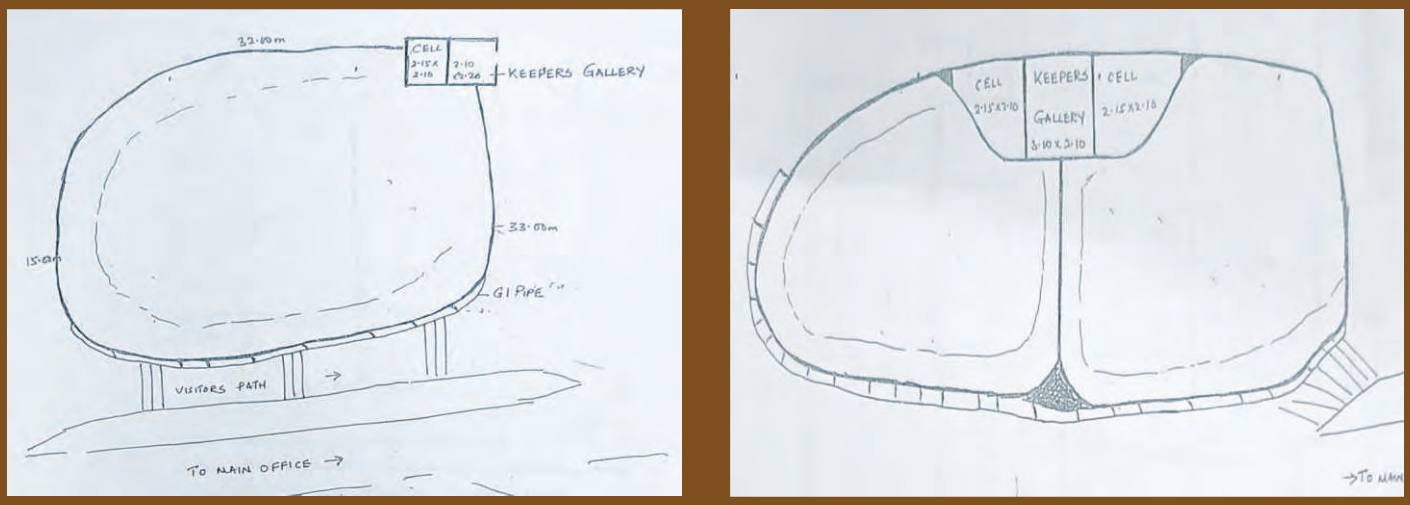


Fig: Pictogram of the open Red Panda enclosure at the main zoo.

The size of the enclosures at the off-display conservation breeding center at Topkeydara is 400sq.m with a fence of a total length of 80m.

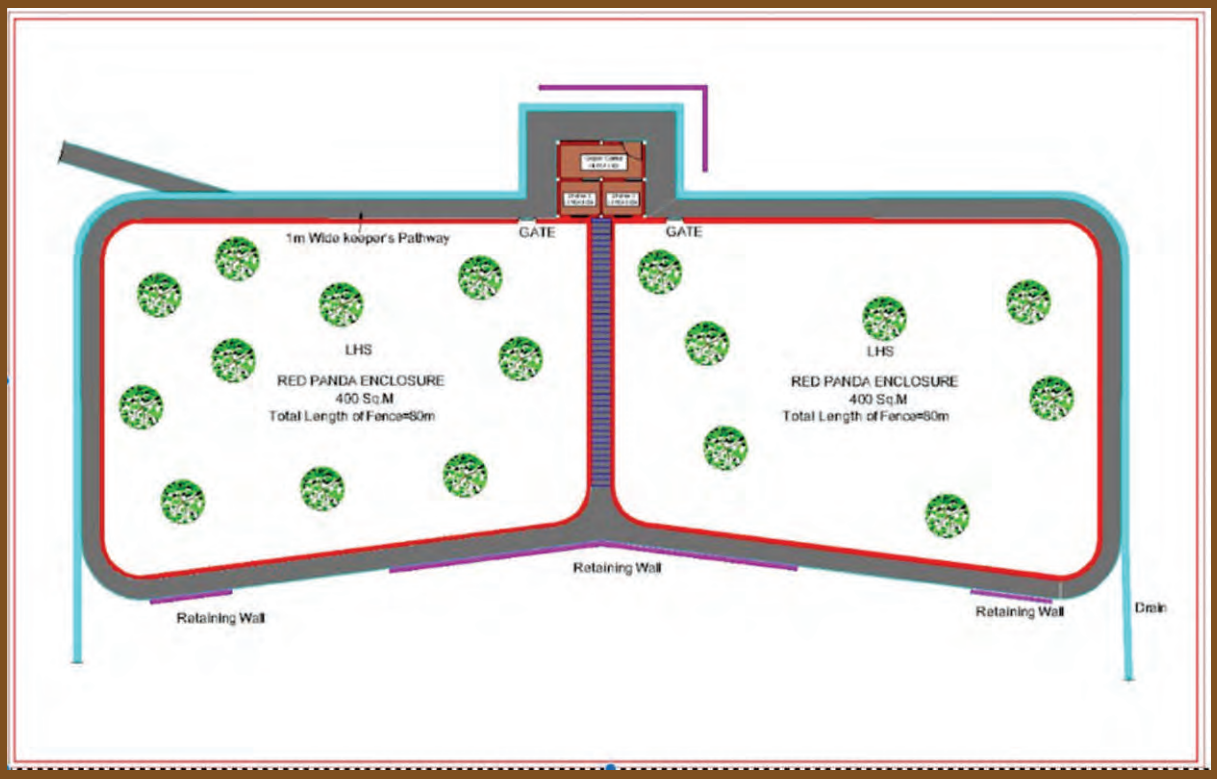


Fig: Pictogram of the open Red Panda enclosure at Topkeydara.

Fig: Aerial view of Topkeydara

Fig: Red Panda Enclosure

Enrichment:

The enrichments have been designed to accommodate all behaviours. Structural enrichment is changed regularly to prevent boredom and reduce stress in animals and to stimulate their natural behaviour. All enclosures are open with undulating topography and natural vegetation. Edible grasses and bamboo have been planted within the enclosures to encourage foraging. The enclosures have been designed to incorporate trees that were naturally present in the landscape. The enclosures are provided with complicated aerial walkways, nesting boxes at varying heights, and resting platforms. Visual barriers made from bamboo are present in patches between enclosures of non-breeding pairs to reduce stress and in the conservation breeding centre during the breeding season to reduce exposure to humans.

Feeding Platforms

Feeding Platforms

Cubbing Box

Aerial Walkways

TALKING HEADS

Zoo Planning and Design Considerations

Prof. Dr. Rommel Mehta
Architect & Landscape Architect
Former Head, Department of Landscape Architecture, SPA
Presently Professor (Design Chair), Amity University, Noida.

Q: What initiated your interest towards zoo designing? This question is in light of the fact that very few architects in India are engaged in zoo architecture. Zoo projects have conventionally (even now) been undertaken by zoo directors/ zoo staff?

It was one of those situations which creeps into your life in the most reticent way without one realizing the destiny it holds. It began, in early 1995, with a letter from the Central Zoo Authority to the Head, Department of Landscape Architecture, SPA, inviting the membership of the zoo design committee. I accepted the membership more out of curiosity than interest. I did not have an overview of the subject discipline but was aware of the fact that, besides other elements, zoos had huge open spaces which obviously required landscape architecture input. At that stage my only impressions of a zoo were those gained out of my rare visits to the Delhi Zoo.

Over the years knowledge and understanding about zoo issues grew which led to increasing design ideas and deeper involvement. This stretch was spread over office meetings and inspection visits to zoos all over India. I secured a deep insight into planning, design, and detailing general issues of zoos.

This is a slightly extended answer to your questions but that's how it happened to me. I acquired the knowledge base to build upon, worked on it and discovered areas where an architect & landscape architect could professionally contribute to alleviate the Indian zoos. Over the years I have suggested a few improvements to the design of Indian zoos.

Young zoo designers can think on these lines to gain experience & knowledge.

Q: What features distinguish zoo designing from other architectural projects?

The answer to that lies in identifying and understanding the different components which constitute a zoo. One major distinction between a conventional architectural project and a zoo design project is the fact that the zoo includes living entities – the animals & the birds. The approach to design, detailing & maintenance must consider that fact.

Within the zoo there are animal areas, visitor's areas, areas for staff & administration, buildings such as hospital & post mortem section, commissary, interpretation center, maintenance, sanitary & garden section, incinerator building, garbage collection area, planting, enrichment within the enclosures, nursery etc. Such areas require architectural & landscape architectural inputs based on the brief provided by the client – the zoo director, and other specialists such as the veterinarian, security and the IT personnel etc. To design these requires knowledge about animals & their needs.

There are associated areas outside the zoo boundary as well, such as vehicular & pedestrian circulation, parking lots, food court, souvenir shop, kiosks, ticket counters etc. These are areas where animal related issues are not involved. For these areas & associated structures, architectural design, standards & specifications are required to be followed.

These are some apparent & identifiable differences in design of zoo projects as compared to the conventional architectural projects. Professional knowledge, skills & experience are necessary prerequisites for designing zoos. To construct a well-designed zoo we need professionals who are trained & are knowledgeable about animal behaviour, the native habitat of various animals & the consequent enrichment requirements.

MASTER LAYOUT PLAN

Q :What suggestions do you have to improve zoo designing, construction detailing and maintenance in Indian zoos?

The short answer to this is that the designers should primarily be architects and/ or landscape architects to ensure that they are professionally qualified to comprehend the project in its complexity and totality. In zoo design professional degree will not suffice if it is devoid of zoo related personal experience & observation backed by basic knowledge of animals. In addition to what is mentioned above the following suggestions will also be useful:

Professionals who design zoos should have spent adequate time in zoos in the company of various domain specific experts. Domain means experts in animal behavior & diseases, in construction methods & techniques, drainage & electrical engineers and IT related aspects. This will ensure that their concept of a zoo is realistic and not outlandish & personal. The problem is that even within the zoo community there is a wide range of opinions based on personal experiences. While personal experiences are valuable, they should not subvert standards & research findings.

Adequate provision should be made for the latest equipment of all kinds by way of budgetary provision and provision of architectural & services requirements.

Since zoos are located in all kinds of social & topographic regions the design should provide activities & elements of interest to involve the visiting public in educational and awareness activities to ensure that the visitors endearingly remember the zoo as a zoo and not simply as a recreational area or picnic spot. Once the visitors leave, they should be able to recognize animals/ birds and should be familiar with basic animal traits and physical facts.

Improvement & innovation in construction detailing can only be achieved if the architect spends enough dedicated time understanding the habits of individual

animals and researching vendors for zoo related requirements such as fencing, security systems and GRC models of enrichment rocks and sculptures.

Also, in my experience, there seems to be an intuitive over reliance on existing construction & fabrication methods which prevents imparting uniqueness to each zoo. Each zoo should be viewed by the designer as a unique entity requiring site specific design inputs because of its unique location and specific animal collection plan.

Q: Comparative references are often made to elevate Indian zoos to international standards. Suggest major professional attributes which will help to improve the visitors experience and zoo staff's work satisfaction?

Let me clarify that even in foreign countries while many zoos certainly are well-designed, some need improvements in various ways. From my visits to some foreign zoos, I found five key takeaways, applicable & suitable for improving Indian zoos.

First, architects who intend to design zoos should get rid of the misconception that zoo designing is plain and simple and does not demand much intellectual & design inputs. That is certainly not true. Over the years I have realized that the zoo design demands are pressing and range from designing architectural structures, animal enclosures, landscapes, water features & a range of services. This demands expertise and experience much beyond what is taught in architectural schools. In my opinion one needs to prepare one's self before one attempts to design a zoo.

Second, since there are no zoo related specifications & items in the bills of quantities, the architect has to focus on these aspects and formulate these documents to achieve at site what was conceptualized by the zoo director and the architect. Failure on this front is likely to result in a zoo which will appear more like a cluster of urban structures than a natural habitat like environment which a zoo requires.

Third, it must not be overlooked that a zoo, generally, is a large area requiring long pedestrian walks. It implies that pedestrian walks must be designed for convenience & even enjoyment of the visitors – which particularly includes the specially abled. These should include shaded passages, drinking water facilities, places to sit & discuss animal issues & placement of appropriate zoo related sculptures.

Fourth, signage, within & outside the zoo, is an extremely important design aspect. The size and location of signage should serve its function of providing appropriate information at the right place by having eye catching graphic design & infographics. The signage should contain text content which should be of interest to the visitors and not highly technical. Those interested in technical information can procure it from the interpretation centre or elsewhere. Besides English, signage text should be written in local language to provide the local visitors information about various animal characteristics. Dissemination of animal related information is also one of the main objectives of CZA.

In my experience this is most often overlooked resulting in exiting visitors who are no wiser about animals then they were before the visit.

Finally, zoo layout and design should incorporate nature & animal habitat environmental features. Layout and design should completely change the mind-set of the visitors, from the urban to the natural, once they enter the zoo premises. This can be achieved by use of appropriately designed materials for structures and pavements. The colour palette for structures, railings, enclosures, gates etc. should align with the colours found in nature – shades of green, brown, yellow ochres & soil colours. Personal choices of the architect & client should not conflict with nature's hues.

The points mentioned above seem easy enough to achieve but actually require a professional insight which should be an inherent part of any zoo designer's skill. Unfortunately, for various reasons, such points are overlooked affecting the zoo quality.

Q: By your vast experience what improvements are required in visitor's facilities of areas adjacent to the zoo – such as parking, approach to the zoo, information dissemination through signage etc. to help visitors enrich their zoo experience?

It must be realized by zoo architects that the visit to the zoo begins from the time they arrive at the parking lot or the entry area. The general impression that the zoo visit starts after the entry into the main gate is erroneous. The visit begins when the zoo comes into view from the road.

The convenience with which the visitors are able to reach the zoo gate from the main road is a significant contributor to the overall satisfaction of the zoo visit. After parking their vehicle the visitors should be able to securely walk along the pathway which should be provided with shade, seats & drinking water facility & public toilets, up to the main gate of the zoo. This orients the visitors mentally to focus on the animals & elements within the zoo.

This seemingly innocuous experience is often ignored in design resulting in a semi-tired person entering and starting the zoo visit.

The passage from the public path or the path from the parking to the main gate provides a good opportunity for dissemination of interesting zoo information. This can be made possible by means of creative signages and communicative sculptures.

This walk should allow 'Divyangjan' to traverse this distance on their own, with ease and enjoyment. This passage should provide for tactile tiles & messages in braille as well.

Q: How does one distinguish between the professional responsibilities of a landscape architect and the contribution of a horticulturist?

There is a difference between the contribution of a landscape architect and that of a horticulturist – both have a distinct & specific niche to fulfill in the design of a zoo.

Landscape architect is a designer who designs landscape with plants keeping numerous other technical project considerations in mind while a horticulturist has an in-depth knowledge of plants – trees, shrubs, ground covers and creepers - along with the associated requirements such as propagation, maintenance & disease control etc. As a result, landscape design is finalized primarily on the basis of functional requirements (at times in consultation with the horticulturist), without disregarding the aesthetic considerations. Final plant selection is done keeping in consideration the horticultural requirements to ensure that the selected plants survive the environment.

Q: Generally, visitors are interested in the kind & number of animals they view in a zoo. What other design elements can encourage the visitors to revisit and possibly contribute to zoo improvement?

This is an interesting question to which individuals will have their own opinion. Yet there are a few principles which I have been able to gain by observation which make the zoo interesting for the visitors and encourage them to revisit.

To begin with, zoo is an entity with which visitors are essentially unfamiliar with except for the basic fact that animals are housed there. But beyond that zoo has

plentiful very interesting information to offer for visitors of all age groups. What needs to be done is to sift technical zoo related information from that which will interest a lay person. For example, animal diseases will not interest a visitor but information regarding the fighting strength of tiger against that of an elephant, bear or crocodile will definitely attract attention; and more so if it is presented with the right graphics & sculptures. There are volumes of such type of information related to animals & zoos which can be disseminated in an attractive format for public consumption.

Such information will familiarize the visitors with specific animals and their habits in a way which will then help them relate animals in their own personal imagination. An added attraction will be to provide attractive usable souvenirs which will perpetuate their memory of the zoo after their zoo visit.

Q: In your writings & presentations you have regularly highlighted the importance of project management in zoo construction execution. Give an insight into what is meant by that and how does it help improve the zoo quality & reduce maintenance costs?

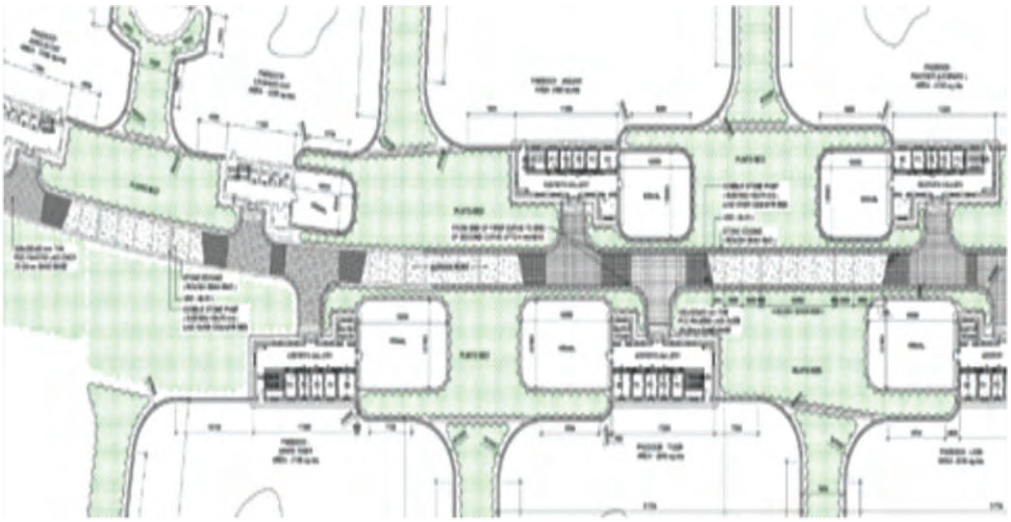
In brief, the sequence of zoo design process comprises the following stages:

1. Initial decision to establish a zoo. This decision is taken by the concerned authority which, in India, may be the central or the state government or a private client.
2. A site is decided & a design brief is prepared to convey the requirements, including the animal collection plan,
3. An architect is selected and he prepares a concept plan based on the design brief prepared by the client – the government or the private client.
4. Documents (bills of quantities, specifications etc.) and drawings (concept drawings & tender drawings) are prepared and the project is formally awarded to a contractor(s).
5. Thereafter execution begins at site and working drawings & updated documents are issued in stages as the work progresses.

Assuming that the drawings & documents are of the requisite standard according to norms, the quality of the completed zoo project depends entirely on how methodically execution procedures have been followed.

On the face of it, it appears that if the drawings & documents are in order then the project will be completely successful. In reality it is not that simple. There are numerous disciplines & contractors involved. In each of the numerous execution works specific sequences & specifications must be meticulously followed. This requires project management which is a highly professional and expensive component of the project. Expenditure and attention on execution ensures that the project proceeds as intended, any discrepancies are sorted out during the execution itself so that the completed zoo is up the standards. A project which is done under strict quality control procedures itself ensures reduced maintenance costs.

In case the execution procedures are not strictly followed, every effort put in by the client and the architect can result in a cipher. To sum it up, investment in quality experience, standard documentation & the necessary monetary expense must be incurred to ensure a successful zoo project.



Q: Can zoo design and planning efforts be made to dovetail and complement national efforts/ schemes towards enhancing 'green/ landscaped' areas and general environmental improvement?

Zoos innately are large areas, often within urban limits, which by their very design have 60% to 80% of the areas under vegetation – trees, shrubs & groundcovers. Along with this the undulating topography has natural depressions which is excellent for ground water recharge. All such elements together form a natural self-sustaining ecosystem which is so necessary in the adverse conditions being created by climate changes.

Government and many other organizations are tryingo create such 'natural islands' by establishment of laws, forest related acts & reclamation of degraded/ wastelands to counter global warming. Considering that large green regional pockets are an absolute essential for the establishment of even the smallest of ecosystems, zoos serve the purpose ideally.

To that extent efforts of the government & zoo architects have a common goal to achieve.

Thank you for sharing your experience and suggestions regarding zoo designing and planning. Which should help to improve zoos in India.

Indian Zoo in focus

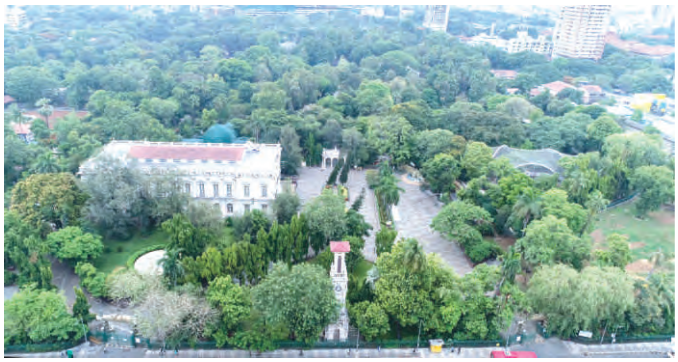
Veermata Jijabai Bhosale Botanical Udyan and Zoo, Byculla, Mumbai, Maharashtra

Veermata Jijabai Bhosale Botanical Udyan and Zoo, one of the oldest zoos in India celebrated its 160th anniversary in November this year. The zoo is spread across an area of 60 acres and is adorned by century old trees and heritage structures. The zoo is declared as "Heritage Grade II (B)" site. The earlier animal exhibits were small and disregarded animal welfare aspects. It was only in 2017 that the zoo started its phase wise revamp based on the modern zoo concept. Located in the midst of a bustling city like Mumbai and with little scope for expansion, the master (layout) plan of the zoo was meticulously designed to avoid cutting trees and also avoid compromising the exhibit area thereby introducing the concept of glass viewing visitor galleries and electric fencing instead of the old moat systems.

In this article we highlight two of the most popular animal exhibits in the Mumbai Zoo- The Humboldt Penguin exhibit and the Royal Bengal Tiger exhibit.

The Humboldt Penguin Exhibit is India's first and also one of Mumbai Zoo's most ambitious projects. There is a misconception among people that all penguins require snowy exhibits. There are 18 penguin species in the world, out of which only few species actually require snow. Humboldt Penguins, found on the rocky shores of Chile and Peru in South America can survive at temperatures ranging between 4 degree C to 25 degree C. The Humboldt Penguin exhibit at the Mumbai Zoo has thus been designed following the WAZA guidelines and considering the natural habitat and requirements of this penguin species. The exhibit is built in an area of 1800sq ft. with 60% area of GRC rock work and

nests and 40% area of water body. The water body has a length of 17 meter and depth of 1.5 meter to enable them to swim freely. The exhibit also has an attached isolation area, a kitchen and Life Support System (LSS) to maintain the water quality of the pool. Multiple nesting areas in the shape of rocks are provided which offer privacy and protection from other penguin pairs. Since the penguins are kept in an indoor facility, it is well equipped with HVAC (Heating, ventilation and air conditioning) technology. Also, the High Efficiency Particulate Air (HEPA) filters and Air Handling Unit (AHU) ensure a healthy circulation of filtered air, enough ventilation and temperature control in the exhibit. A temperature of 13-15 degree C and humidity of 60-65 % are maintained in the exhibit.



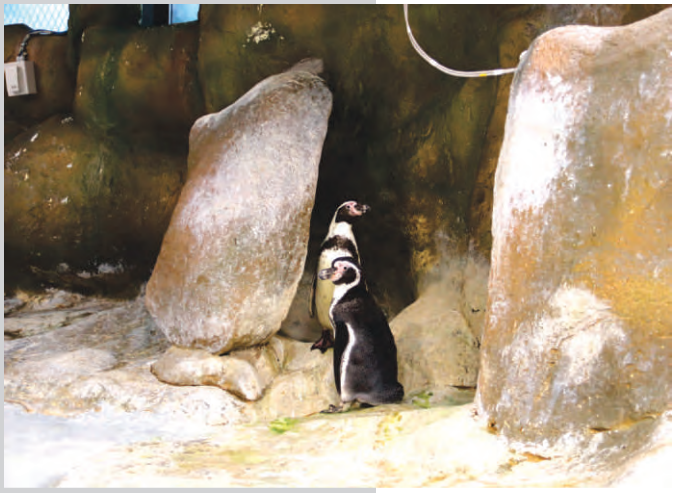
The exhibit also has provision of a glass window to allow natural sunlight which is important for their moulting and reproduction cycles. Moreover, the LED lights in the exhibit are gradually switched on during the day and dimmed in the evening to give them an indication of day and night transition. The visitor viewing part of the exhibit is fitted with acrylic glasses of 50mm thickness to facilitate clear view of the penguins swimming under water.

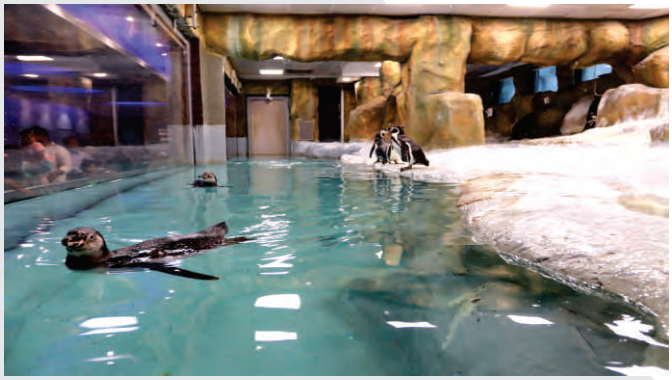
Royal Bengal Tiger Exhibit: The Ranthambore fort ruins where the famous Tigress Machli used to rest inspired the exhibit and landscape design of the Tiger exhibit in the Mumbai Zoo. The 3500 sq meter area exhibit has lush green landscape with

various flowering trees and medicinal herbs. To avoid cutting the existing trees in the periphery they have been electrically fenced. A flowing water body with three different depths leading to the viewing gallery has been provided. The acrylic glass panels of 50mm thickness in the viewing gallery gives the visitors the unique experience of seeing the tiger swim underwater which is first of its kind in India. The LSS has the capacity to filter the 1 lakh L water body ensuring good water quality and clarity. The long stretch of glass viewing gallery is built on the theme of the aesthetic Jogi Mahal in Ranthambore.

The exhibit is provided with five night shelters and three kraals with an attached squeeze cage and a zoo keeper's room.

All the zoo exhibits are disable friendly and also provided with multiple self-explanatory information boards. Zoos in India have come a long way in terms of exhibit designs. In city zoos where space is always a constraint, glass viewing visitor galleries promise a great visitor experience while also ensuring animal safety.





International Zoo in focus

Toronto Zoo, Canada

The Toronto Zoo's mission is connecting people, animals and conservation science to fight extinction. As our natural world is increasingly at risk, the role of accredited zoos has become critical to the long-term conservation planning if we have any chance of successfully reversing some of these devastating effects. We cannot address the challenges alone, and partnerships and community are integral to our collective success to ensure our natural world is thriving.

Located in Southern Ontario, Canada, the Toronto Zoo is intricately woven into the greater urban fabric of Toronto, nestled beside the Rouge River, in one of the many ravines that are iconic to the City. With over 10 km of walking trails, the Zoo is home to over 3,000 animals and over 300 different species.

When the Toronto Zoo opened in 1974, it was celebrated as one of the most forward thinking and innovative zoos in the world. A zoogeographic approach was the basis for the original layout of the Zoo, which meant animals and plants from the various regions around the world were positioned close together, a revolutionary design that provided a more natural experience for guests to be immersed into the animal and plant's natural settings. Over 30 years ago, the Zoo began along a path of strong commitment to pursue science and research as a core focus. Toronto Zoo was one of the first Zoos to have a dedicated full time Nutritionist and shortly after Reproductive Physiology department.

Leadership in research and scientific discovery continues today with great investment in Wildlife Health and Sciences work through growing collaborations with academic partners. As the Zoo approaches a big milestone 50th Anniversary, the commitment to innovation remains a core priority in implementing both optimal living conditions for the animals in our care, but also in enhancing and establishing key partnerships and support of in-situ conservation efforts.

In 2020 the Toronto Zoo presented a new strategic plan, with a bold and ambitious vision. Our team of more than 1,100 employees and volunteers is committed to making our great Zoo an even greater force for conservation—by providing unparalleled animal care; by engaging our audiences in fighting extinction; by advancing our understanding of conservation science; by connecting our animals and our programs to field conservation efforts; and by creating a sense of optimism for a bright future for wildlife, wild places, and the people who inhabit them. It also introduced the core concept of "Four Cares" which includes caring for animals, our team, our guests and our community. These four cares are central to all considerations and decisions.

In the Summer of 2023, the Zoo is proud to be opening a new state-of-the-art outdoor orangutan habitat. Wild orangutans spend almost all of their lives high up in the trees, and this new facility will provide more opportunities for them to spend time there! Tragically their forest homes are being cut down or burned at an alarming rate to make way for the planting of oil palms. One of the goals of the new outdoor orangutan habitat is to connect our guests with the issues facing orangutans in the Sumatran rainforest. The new habitat will be designed to for the orangutans' physical, social and intellectual needs, and enrich their daily lives.

Excellence in animal welfare is the underlying foundation for everything we do at the Toronto Zoo. In designing the outdoor orangutan habitat, we brought together internal and external experts to ensure we captured all of the elements that would allow our orangutan's every opportunity to thrive. A key component was to provide the animals withchoice and control over their environment. This new habitat is flexible, stimulating, enriching, and provides challenges that build physical and cognitive skills for their overall wellbeing. We are using innovative technologies to better understand each individual orangutan's experiences so we can custom fit elements in their new home. Educational interactive opportunities permeate throughout the habitat focusing on the wonder of these intelligent animals, threats that orangutans face in the wild, choices individuals can make to help save orangutans, with the goal of empowering our community to take action and create change. By providing our orangutans with this incredible new environment, showcasing our care for these amazing animals, we are telling stories and

creating memories for our guests that will underpin their commitment to conservation so they join our efforts in saving this critically endangered species from extinction.

Some key features of the new outdoor orangutan habitat include:

- Recirculating waterfall/stream
- Puzzle feeders to support animal enrichment
- Drinking water at ground level and at the tops of some towers
- An interactive water spray feature where the orangutans can push a button to spray guests with water
- Feeders at the tops of the orangutan towers that can be loaded by keepers from the ground
- Cameras at the top of every orangutan tower
- Separate habitats within 1 habitat so multiple groups of animals can be on exhibit at one time without having access to each other
- Real trees and artificial climbing structures connected with ropes so orangutans have climbing choices and places to build nests
- Interpretive signs to educate guests on orangutans and how humans are affecting their natural habitats/what we can do to help orangutans in the wild
- Artificial orangutan nest display and an area where kids can build their own orangutan nests
- Treehouse/elevated viewing platform for guests to see orangutans eye-to-eye up high
- Interactive digital display
- An Orangutan app for guests to play a game
- A Climbing area where kids can mimic orangutan climbing behaviours
- Orangutan training wall where guests can watch keepers interact with the orangutans up close
- Behavioural research facility where guests can watch behavioural scientists and keepers work with orangutans up close
- Approximately 250 foot long overhead orangutan crossing above a natural ravine

The new habitat will also include a research station where animal behavioural scientists will study these majestic tree dwellers. What we learn here will be shared globally to help improve their well-being in human care and help restore the wild Sumatran orangutan population. Our new habitat will also provide educational opportunities to learn more about the factors impending orangutan survival, and the positive actions each and every guest can take to fight extinction of these critically endangered animals.

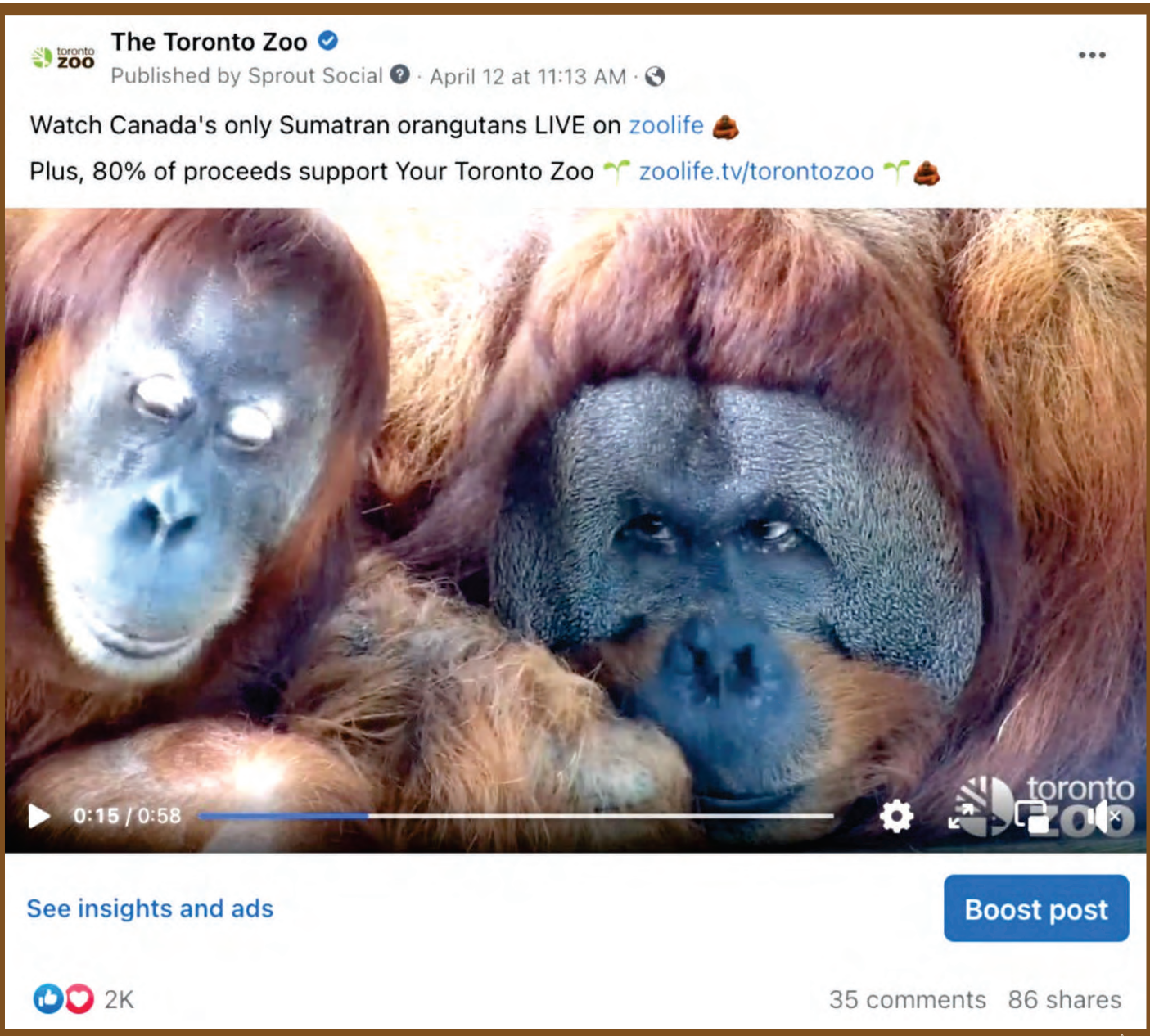
As part of our public engagement, the Zoo has partnered with Brizcam as the first participating zoological institution in a program called Zoolife, which supports livestream of animals from Zoos around the world to audiences providing real time opportunity to watch and follow their favourite animals in their day-to-day activity. The existing orangutan habitat is one of the locations currently hosting a livecam, and a new camera will be installed in the new outdoor habitat as well once completed, providing strong engagement and education opportunities virtually.

The role of accredited zoos has never been more critical as their populations decline and we continue to lose thousands of species each year due to climate change, loss of habitat due to deforestation, mining and development while also dealing with the challenges of illegal wildlife trafficking. Sumatran orangutan populations are under increasing pressure due to habitat loss and the palm oil crisis.

In 2017, the conservation status of Sumatran orangutans was changed from Endangered to Critically Endangered by the International Union for Conservation and Nature (IUCN). The Toronto Zoo is proud to participate in the AZA SSP program as well as the Saving Animals from Extinction (SAFE) Program specifically for orangutans. These programs, as well as our efforts through this conservation breeding program, help ensure this incredible species continues to survive for future generations.

The Toronto Zoo and the Toronto Zoo Wildlife Conservancy have partnered with the Sumatran Orangutan Conservation Programme SOCP to provide $250,000 over 10 years to support orangutan conservation in the wild. This partnership will allow for long-term support which is invaluable in preventing the extinction of Critically Endangered species. PanEco is a Swiss-based Foundation that for more than 20 years has worked in partnership to protect and conserve orangutans in Sumatra and their rainforest habitat, through the (SOCP); a collaborative initiative run by Indonesian NGO Yayasan Ekosistem Lestari (YEL) and the Indonesian Nature Conservation Authorities.

Innovative design, research opportunities, animal welfare, partnerships, conservation program support and public engagement are ways the Toronto Zoo is creating a new habitat for orangutans that is not only an exemplary home for the orangutans in our care, but to help ensure there are orangutans in our world for generations to come.



Notes

ZOO CLIQUE

Modernisatin of Zoological Garden,
Thiruvananthapuram



ZOO IN HISTORY

Zoological Garden, Thiruvananthapuram

Text & Photos:

S. Abu,

Director, Department of Museums and Zoos,
Government of Kerala

Humans have progressed from wild to his urban dwelling. But his evolutionary hangover being wild born is hard to die out. Hence his fascination with wild animals which is so ancient and widespread that it can found in children's stories, mythologies, toys, clothing etc. This fascination with the wild gave rise to Menagerie to Zoo to Zoological Gardens and Safari Parks.

Zoological Garden, Thiruvananthapuram is unique in India for its breathtaking landscapes and luxuriant growth of vegetation. Royal look of lofty trees, towering bamboos, lush green landscapes give it a rare distinction of being one of the most beautiful zoos in South East Asia. The Zoo is one of the largest Zoo among 14 Zoos in India.

The Trivandrum Zoo is one of the oldest of its kind in India (currently the oldest Zoo in India in its original location). Swathi Thirunal (1813-1847), illustrious king and music composer who ruled southern Kerala (Travancore) during 1830-1847 is said to be the visionary behind establishment of the Trivandrum Zoo. Immediately after his assumption of power, he modernized the horse breeding establishment at Thovalay (near Kanyakumari, Tamil Nadu) and some fine mares were procured. The best elephants from the forest Department and other places were selected and cantoned at Trivandrum. To the Trivandrum stables was a menagerie, where royal tigers, panthers, cheetahs, deers, boars and all sorts of wild animals which are abound in the Travancore forests were collected and caged. It is also known that a lioness which had been imported from Africa into the French settlement at Mahe was purchased and added to the collection of animals. Birds of all kinds, indigenous and foreign were collected. While being open to sightseers, it is also said to have been used for sham sport. It can be justly said that Swathi Thirunal thus created a nucleus for the modern Zoo in Trivandrum. It was however left to his brother Uthram Thirunal Marthanda Varma to formally establish this institution.

The Zoo was started in 1859 with gracious gift by His Highness the Uthram Thirunal Maharaja of his small palace menagerie which consisted of a few important animals like Tigers. The collection is mainly representative of the Fauna of Kerala. Since its inception, the number of animals kept in the Zoo showed progressive increase. During the years 1880-90 the provision of improved accommodation to the animals of the Zoo, the number of which had by this time swelled to about 300, received special attention. A magnificent house for the larger carnivore designed on the model of the cages of the Zoological Gardens of London was constructed. Such rare animals as the Ourang Outang, Malay Tapir and Rhinoceros, were exhibited in the Zoo even in those early days. By 1935 the steady development of the Zoo necessitated the acquisition of additional grounds. The lions and tigers were provided with the nearest approximation to their natural habitat at the time which can be seen in the Zoo even toady. During that time Zoo contained a good representative collection of animals and birds both indigenous and exotic.

In 1998, the Government of India came out with National Zoo Policy that clearly marked a change in the focus of animal collection and exhibition. The idea of the Zoo as centers of recreation and entertainment was rejected in favour of a focus on conservation, education and research. Thus the motto of the Zoo was changed from more species with less facility to less species with more facilities.

The Central Zoo Authority came into being in 1992 with the main objective to complement the national effort in conservation of wild life. Bringing up standards and norms for housing, upkeep, health care and overall management of animals in zoos and to provide technical and financial assistance to such zoos which have the potential to attain the desired standard in animal management.

Modernisatin of Zoological Garden, Thiruvananthapuram

Next big thing happened in Zoological Garden, Thiruvananthapuram after its inception in 1959 was that of Moderniation of Zoo with the technical and financial assistance from Central Zoo Authority in 1999. The Modernisation scheme has been drawn up by an expert Committee constituted by the Government of Kerala and also approved by the State Government. The scheme envisages shifting the Zoo animals from their old cages to open air houses with nearly natural settings as also to provide better upkeep and health care so as to meet their Social, Biological and Psychological needs.

The Zoological Garden, Thiruvananthapuram for commencing its modernisation is very much indebted to Shri. HJ Desai, former Member Central Zoo Authority; Shri. SK Patnaik, Member, Technical Committee, Central Zoo Authority, Shri. C.S. Yalakki IFS former Director, Department of Museums and Zoos.

The moderisation could provide large areas to its inmates devoid of iron bars and other obstacles that obstruct the natural setting. A pseudo ecological back ground to give the animals a feeling of being in their habitat as most of the cages where outmoded with the changed concept of Zoo management. The modernisation was undertaken in a phased manner. Sri. Pushpa Kumar I.F.S., Principal, C.C.F. (Wildlife) (Rtd.) was appointed by the Central Zoo Authority as Consultant for designing and monitoring of the project. With the modernisation of Zoo hospital, enclosures for primates, Rhinoceros, Elephant, Hippopotamus, Flightless Birds, Giraffe, Zebra, Otter, Cape buffalo, Reptile house, Bears, Nilagai, Emus, Jaguar etc Could be completed.

This Zoological Garden is unique in India for its breathtaking landscapes and luxuriant growth of vegetation. Royal look of lofty trees, towering bamboos, lush green landscapes give it a rare distinction of being one of the most beautiful zoos in South East Asia. Spread over 36 acres of land and located in the heart of the city it provides a respite for the people of Thiruvananthapuram as much it offers tourism and recreation for visitors reaching from outside Kerala and overseas.

Among the among collection the prime position was held by the Elephant Maheswari brought from a forest area in Konni, now in Pathanamthitta district, in 1946. She was considered to be a white elephant. The Royal family would visit her on auspicious days. She died at the age of 85 in 2015.

Life of Pi'written by Yann Martel, the Booker Prize-winning story of an Indian boy who is stranded on a boat in Pacific Ocean with a Bengal tiger was inspired by Thiruvananthapuram zoo. Martel had spent a lot of time in Thiruvananthapuram zoo during his Indian visit in 1996. Nobody then knew that the animals in the zoo would turn immortal characters later.

The Zoological Garden, Thiruvananthapuram has a long stretch of road in an undulated terrain, which has always been a long distance for differently abled visitors and elderly people to travel and see all animal. The Department has provide equal opportunities for all visitors and to ensure that our visitor facilities are accessible to everyone so that even differently abled visitors can see the length and breadth of the Zoo as well as its valuable collection. We believe everyone has the right to experience the Zoo and the great outdoors, regardless of ability. That's why we're dedicated to providing an accessible experience to all of our guests

It is sincerely hoped that within next few years the Zoological Garden, Thiruvananthapuram will transform itself into a bio-diversity Conservation research centre.

Birth of Hyena

Central Zoo Authority
केन्द्रीय चिड़ियाघर प्राधिकरण

Central Zoo Authority

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