

Master Plan  
of the  
Greens Zoological, Rescue and  
Rehabilitation Centre



Submitted by the  
Greens Zoological, Rescue and Rehabilitation Centre  
Society  
for the period of,

2024 -2034

To the  
Central Zoo Authority,  
Ministry of Environment, Forest & Climate Change,  
Government of India

January 2024



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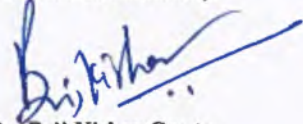


## CERTIFICATE


This is to certify that the Master Plan of the Greens Zoological, Rescue and Rehabilitation Centre for the period from 2024 to 2034 administered by the Greens Zoological Rescue and Rehabilitation Centre Society, has been prepared under my supervision.

The Master Plan has been checked and verified by me and is in compliance with the Wildlife (Protection) Act, 1972, Recognition of Zoo Rules, 2009 & Guidelines of the Central Zoo Authority.

Place: Jamnagar  
Date: 12/07/2024

  
**Dr. Brij Kishor Gupta**  
Member-Secretary,  
Greens Zoological, Rescue and  
Rehabilitation Centre Society

Master Plan has been approved vide letter no 20-1/2019-CZA(NE)- 1/74064/2024 dated 6<sup>th</sup> June 2024, subject to the condition that the responsibility of mobilizing financial resources for implementation of the Master Plan will be the sole responsibility of the Greens Zoological, Rescue and Rehabilitation Centre, Gujarat.

  
सदस्य साधेव/Member Secretary  
केन्द्रीय विज्ञानपर प्राधिकरण/Central Zoo Authority  
पर्यावरण वन और जलवायु परिवर्तन मंत्रालय  
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**Government of India**  
**New Delhi**



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Under the directions of the Members of the Expert Group of Zoo Design of CZA.

With many hours of valuable inputs from Dr. Brij Kishor Gupta, Member-Secretary, GZRRCS and,

Supported by:

- Dr. Sitendu Goswami
- Dr. Prudhvi Raj Gunturu

We would like to sincerely thank all the staff of the Greens Zoological, Rescue and Rehabilitation Centre for providing us with information and data. The shared experiences, and their timely contribution is appreciated.



## Preface

The Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) Master Plan outlines the plan for delivering our mission, vision and goals through our zoo. The Master Plan will set the direction for the zoo's future growth in accordance with goals of Greens Zoological, Rescue and Rehabilitation Centre Society (GZRRCs). We believe that GZRRC will be one among the best zoos of the world. The Master Plan is ambitious but achievable, which builds on existing strengths, is flexible and adaptable to changes, and takes into account all of the requirements of the organization. The Master Plan is composed of several layers that work well together, including zoo development employing sustainable designs, human resource planning, collection planning, visitor, education services, conservation activities, safety, and horticulture. The Master Plan will increase the overall ability of GZRRC to deliver the projected results within the desired time period.

Our Master Plan will increase GZRRC's capacity to handle foreseeable challenges and make the most of future opportunities. GZRRC's Master Plan has been developed in four parts including 12 chapters in accordance with the guidelines furnished by the Central Zoo Authority. Part one gives background information about GZRRC, including its history, strategic directions, and design principles. It also includes assessments of the organization's facilities, animal collection plan, administration, scientific endeavours, *ex-situ* conservation breeding, and educational programmes that influence project direction and development. Part two describes the action plan for the future, including the proposed animal collection plan, proposed designs for all facilities and projects, human resource planning, disaster management, contingency plans, capacity building, and other aspects of development identified in the plan to be implemented within the proposed time frame. Part three provides a detailed breakdown of the budget management strategy and the anticipated budgetary costs that will be incurred over time. Part four include extensive annexes to the maps, the current inventory, the region's rich flora and fauna, and significant organisational documents.

This Master Plan's depth and vision attempt to capture the ambitions and aspirations of all GZRRC stakeholders for the long-term success of the institution. These contributions demonstrate the value and strength of GZRRCs and will help the GZRRC become a future-focused, efficient, and sustainable zoological institution.

Dr. Brij Kishor Gupta  
Director,  
GZRRC



## Foreword

Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) Master Plan for the period 2024-2034 supports the Greens Zoological, Rescue and Rehabilitation Centre Society (GZRRCs) Vision and Mission with regard to conservation of biological diversity of the planet. A Strategic Plan that envisages and demonstrates GZRRC's commitment to conservation of threatened species and their recovery programs is important to achieve goals in a time bound manner. Greens Zoological, Rescue and Rehabilitation Centre will play a significant role in educating the community about the importance of protecting our natural environment for future generations. This Strategic Plan presents GZRRC's objectives of wildlife conservation as an integrated strategy. This approach complements the overall vision and shared goals of other state and national government agencies to achieve a healthy environment by conservation of our natural resources. Greens Zoological, Rescue and Rehabilitation Centre Society and the Gujarat State Government share a commitment to protecting the State's biodiversity using *ex-situ* conservation measures and research by using cutting edge technology. Greens Zoological Rescue and Rehabilitation Centre has already made great strides towards the rescue and rehabilitation of many rescued wild animals at its facilities. The GZRRC Master Plan, a 10-year roadmap for developing innovative animal enclosures and habitats, site infrastructure, and public services and amenities on our 685.14-acre campus, is critical to the implementation of the GZRRC's Strategic Plan. The Master Plan prioritizes continued capital investments and our commitment to operating the GZRRC in a fiscally and environmentally responsible manner. The Master Plan is supported by a financial plan that outlines the capital and operational funding required to achieve the GZRRC strategic objectives. I would like to congratulate GZRRC for its unwavering commitment to securing a wildlife-friendly future, and on an inspiring Master Plan that tackles the challenges faced by wildlife today. I am confident that the proposed Master Plan of the GZRRC, will guide us in achieving the stated objectives of the GZRRC in the next twenty years.

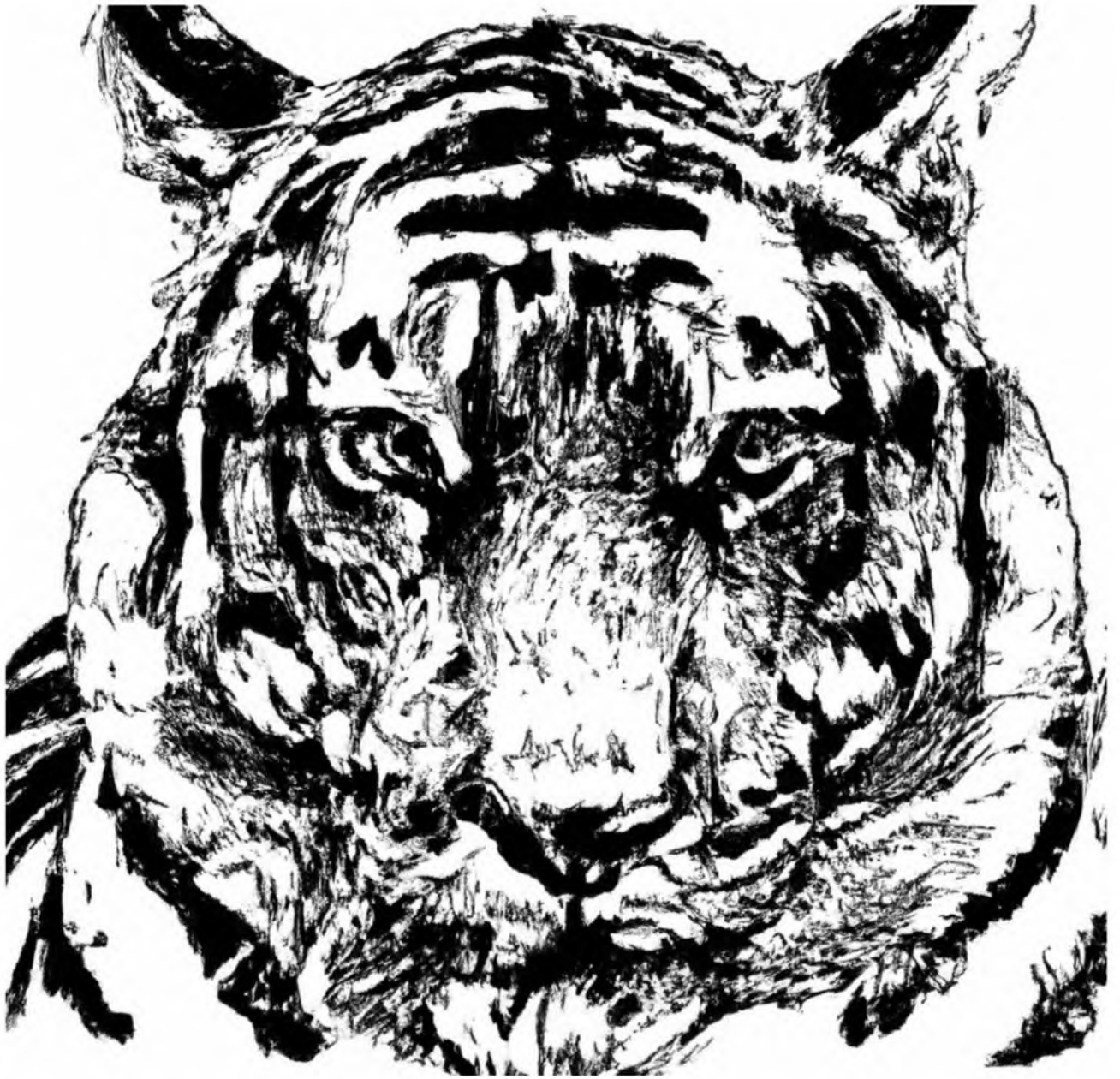
Vivaan Karani  
Chief Executive Officer,  
GZRRC







Part-I





# 1 Introduction

Zoos today must fulfil several roles to achieve the purpose of biodiversity conservation and public education. Unlike zoos of antiquity, modern zoos are centres for conservation, rescue, and rehabilitation and helps us curb the rapid decline of biodiversity in the twenty-first century. While in the early nineteenth to twentieth century, rapid acquisition by zoos led to the over-exploitation of several species and natural habitats, modern zoos have contributed to the conservation breeding and reintroduction of several critically endangered species. India has over 149 recognized zoos and rescue centers working under the ambit of the Central Zoo Authority(Gupta, Pattnaik, and Sinha 2006) to meet the goals of the National Zoo Policy, 1998. Zoos are an essential Forestry activity, essential for the conservation sensitization of local populace and the maintenance of captive insurance populations of threatened fauna. There is a need to optimize and streamline zoo operations to ensure that each zoo is able to meet its target and goals. Under the recognition of zoo rules, 1992[Rule 10(51)](1992).

*Each zoo shall prepare a long-term master plan for its development. The zoo shall also prepare a management plan, giving details of the proposal and activities of development for next six years. The copies of the said plans shall be sent to the Central Zoo Authority.*

The Master Plan document for a zoo is designed to provide an overview of the vision, mission and goals of the zoo along with an overview of its layout and collection plans. The Master Plan document should evaluate the present condition of the zoo and also project the future direction for the institution. This Master Plan document has been drawn up in a manner that the proposed Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) being operated by the Greens Zoological Rescue & Rehabilitation Centre Society (GZRRCs) will be a leader in wildlife conservation with active role in rescue & rehabilitation of animals, animal welfare, wildlife education, captive animal management and research. This will be achieved by joining hands with the Government of India, State Government of Gujarat, other States government agencies and institutes of international repute in their ongoing efforts to conserve wildlife.

The Master Plan report of the GZRRC is a comprehensive document to guide systematic and planned development(Coe and Gupta 2007). The report is planned keeping into account its land, financial, personnel, physical and aesthetic resources and constraints. It provides a holistic overview of the planned wildlife conservation activities, education, and rescue & rehabilitation of wild animals with special emphasis on human-wildlife conflict and capacity building. The master plan sought to create new standards for exhibit design, one with state-of-the-art facilities and programs while optimizing conservation education, enriching life for visitors and animals, and inspiring action to protect wildlife and their habitat. This document will help in the optimum utilization of resources in a planned manner, without being affected by individual opinions or uninformed public opinion and shall serve as a document to guide annual budgeting and personnel planning.

## Foundation of GZRRC

The Greens Zoological, Rescue and Rehabilitation Centre has been established to realize the goal of nation development and biodiversity conservation epitomized by the Reliance Industries Ltd. (RIL). The GZRRC will strive to drive the impetus for biodiversity conservation globally by protecting endangered fauna from the threats of stochastic extinction vortices. According to Mallinson (1995), twenty-first century zoos have a crucial role to play in the protection of earth's natural resources and protecting our planet from the ravages of biodiversity loss.

Reliance Industries Ltd. (RIL), in its letter dated 5th September 2017 to the Honourable Chief Minister of Gujarat, had expressed the willingness for the establishment of Zoo cum Wildlife Rehabilitation Centre at Jamnagar. RIL also requested in-principle approval and advice to get respective department like Forest and Environment Departments, Revenue Department and other relevant departments to grant necessary approval for the implementation of the project. Subsequently, on 7th January 2019, RIL submitted a proposal to the Member Secretary, CZA along with application for recognition under section 38 (H) sub section 2 of the Wild Life (Protection) Act, 1972 for the proposed establishment of Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) at village Kanalus, Taluka Lalpur, District Jamnagar, Gujarat. In the meantime, the Chief Wildlife Warden (CWLW), Government of Gujarat wrote to the Member Secretary, CZA vide letter dated 23rd Jan 2019 requesting for the establishment of GZRRC at Jamnagar as it will strengthen the state's effort in conservation, education and awareness of wildlife in general and especially of Gujarat. The CWLW also mentioned that in view of the infrastructure, financial and organization strength of the agency, he recommends the grant of approval to the proposed GZZRC at Jamnagar in accordance with the CZA guidelines. On 14 Feb 2019, CZA granted approval for the establishment under section 38-H (1A) of the Wildlife Protection Act, 1972(1972) for the establishment of GZRRC subject to certain conditions. CZA evaluated GZRRC facilities on 8th August 2020 and the recognition was granted on 17th August 2020 and is valid until 16th August 2023. On 10th March 2021, Greens Zoological, Rescue and Rehabilitation Centre Society (GZRRCs) was registered under the Societies Registration Act, 1860. Since then, the GZRRCs has been looking after the day-today operation of the GZRRC. The quarantine centre of the zoo was opened on 4th July 2021 to cater the need to quarantine animals that are either sick or acquired from other zoos.

## Vision of GZRRC

The vision of GZRRC is a single statement that outlines its long-term aspirations that acts as a beacon to guide it in its journey through biodiversity conservation.

To garner a global reverence for nature, while conserving biodiversity by strengthening *ex-situ in-situ* linkages.

For the establishment of the Greens Zoological, Rescue and Rehabilitation Centre, the following vision has been outlined:

- (i) The Greens Zoological, Rescue and Rehabilitation Centre aims at making the facility to International standards following the modern trend of design as open, naturalistic, and eco-friendly zoo. No activity would be undertaken by the Greens Zoological, Rescue and Rehabilitation Centre that disturbs the natural landscape of the area. The design of animal enclosures and the support infrastructure would be such that they can merge fully in the environment of the Greens Zoological, Rescue and Rehabilitation Centre.
- (ii) The Greens Zoological, Rescue and Rehabilitation Centre shall house only such species, which can be provided quality life of adequate longevity so that they can breed and lead to self-sustaining and genetically and behaviourally viable population at the zoo.
- (iii) The Greens Zoological, Rescue and Rehabilitation Centre shall maintain highest standards of educative signage and interpretation facilities at the animal enclosures to enable the visitors in having a rewarding experience at the zoo.
- (iv) Greens Zoological, Rescue and Rehabilitation Centre shall endeavour to maintain and enhance the naturalistic and aesthetic value of the area.

## Mission

The Greens Zoological, Rescue and Rehabilitation Centre is committed to saving endangered species by uniting our expertise in animal care and conservation science with our dedication in inspiring passion for nature through best practices of management and bringing education and awareness among people.

## Strategy of GZRRC

GZRRC is dedicated to the exceptional welfare and well-being of its animals and people alike. People's learning and development will help the organisation grow. A safety-conscious workplace culture will be instilled in all members of the organisation. To maintain financial success, data-driven decision making will be used. The organization's physical assets will be constantly maintained and improved. All legal and compliance requirements will be met by the organisation. For the comfort and well-being of the animals at the facilities, science-based animal welfare practices will be followed. In terms of animal care, we will follow world-leading animal care practices to ensure that the animals have the best possible lives. A strategic site-specific animal collection plan with staff expertise is planned. We will strive for recognition and involvement of the Zoo's conservation expertise for *ex-situ* and *in-situ* conservation activities as part of an effective wildlife conservation strategy. For long-term conservation outcomes of endangered species, we will form field partnerships with local and international organisations. We will make a concentrated investment in conservation innovations to use in our conservation-related programmes.

## Objectives of GZRRC

The objective of establishing this Greens Zoological, Rescue and Rehabilitation Centre is to provide a safe, natural, unpolluted, undisturbed and ambient space for animals and animals which shall come as injured, orphaned, or rescued or due to man-animal conflict or by way of exchange from zoos or as surplus from other zoos.

- The Main objective of establishing this Greens Zoological, Rescue and Rehabilitation Centre is to complement and strengthens the national efforts in conservation of the rich biodiversity of the country.
- Greens Zoological, Rescue and Rehabilitation Centre aims to conserve endangered species by breeding, increase healthy population by rehabilitating them back in the wild.
- Providing opportunities for scientific studies useful for conservation of wildlife and creation of database for sharing between the state and central government.
- To collect and collate the scientific data on the biology, behaviour and healthcare of various species of wild animals housed at the Greens Zoological, Rescue and Rehabilitation Centre and use the same in future management of the Greens Zoological, Rescue & Rehabilitation Centre. This data can be used to inform policy makers for holistic *in-situ* research interventions for long-term biodiversity conservation.
- To create among the visitors' compassion towards wild animals through better understanding of the linkages of long-term survivals of various species of wild animals to availability of fertile soil, potable drinking water and pollution free environment.
- To assist in conservation of various species of wild animals and their habitat by sensitizing the people about the benefits of adopting sustainable life styles.
- To provide the opportunities to the public to see the wild animals' close quarters, so the Greens Zoological, Rescue and Rehabilitation Centre will have a sensational value not only for public but for children also. This will certainly bring the happiness movement in their life.
- Greens Zoological, Rescue and Rehabilitation Centre will act as a Rescue center for orphaned/ seized/ accidental/ injured/ imprinted from human habitation, wild animals. Rescue animal will be released in the wild as soon as possible after treatment.
- To educate and aware zoo visitors for conservation, protection and to explain them their role in balancing the ecosystem.
- To provide rescue facility to injured wild animals through best veterinary services.
- To provide shelter to the animals which have strayed out of their habitat and cannot be released back in the wild.
- Conservation breeding of endangered species of wild animals, available within central highlands of India.

- To provide housing and upkeep to the orphaned animals of endangered of species rescued from the wild.

The proposed Greens Zoological, Rescue and Rehabilitation Centre will provide an opportunity to strengthen the initiatives taken for conservation of rich bio diversity of the state.

## Physical features of GZRRC site

The proposed site for establishment of Greens Zoological, Rescue and Rehabilitation Centre is located at village Kanalus, Lalpur taluka in Jamnagar district in Gujarat and is situated 27km away from Jamnagar city. The proposed site is situated along side Sir P N Road and neighboring area. This is a major district road that connects State-highway number 25 (Jamnagar-Dwarka) and State-highway number 27 (Jamnagar-Porbandar). The total area is approximately of 685.14 acres. The site is in close proximity of Punna and Sasoi Dam, which is located at the distance of about 500m and 1.5km respectively from the proposed site. The Satellite facility, its extension and quarantine area are located at different locations and their details are shown in the annexed Master Layout Plan.

## Geomorphology Type

Physio-graphically, the Jamnagar district can be divided into the Hilly areas, and plains (Coastal & Alluvial). Jam-Jodhpur and Lalpur talukas are characterized by hilly terrains while Jamnagar and Jodiya talukas are characterized by plain topography. Cliffs are found in the Dwarka taluka of Dev-Bhoomi Dwarka District with height upto 30m. Barda, Alech, Gop etc., are famous hill ranges in the vicinity. Mount Venu is the highest summit of Barda hills that attains a height of 617.1 m. Okha Rann of Dev-Bhoomi Dwarka District is a low-lying marshy area. Low coastal dunes and sand banks run along the north coast. Jamnagar and Jodiya are plain areas.

## Rock and Soil

Soils of the district may be broadly classified as coastal alluvial, medium black, shallow black and hilly. The medium black and shallow black soils are the main soil type of the district, while the coastal and hilly soils are the sub-soils.

The black soil is rich in mineral and organic matter and is more fertile. The medium black soils are found in Dhrol and Jamnagar talukas. These soils are generally 25 to 50 cm deep. Shallow black soils, which is about 25cm deep is found in Kalawad, Jam-Jodhpur and Lalpur talukas. The coastal alluvial soils are found in Jamnagar and Jodiya talukas. These soils are mostly saline and alkaline in nature. Hilly soils are found in southern parts of the district, particularly Lalpur, Jam-Jodhpur and Kalawad talukas. On the basis of Ground Water Scenario and Hydrogeology, the district area can be broadly grouped under hard rocks comprising “Deccan traps” and soft rocks comprising “Tertiaries

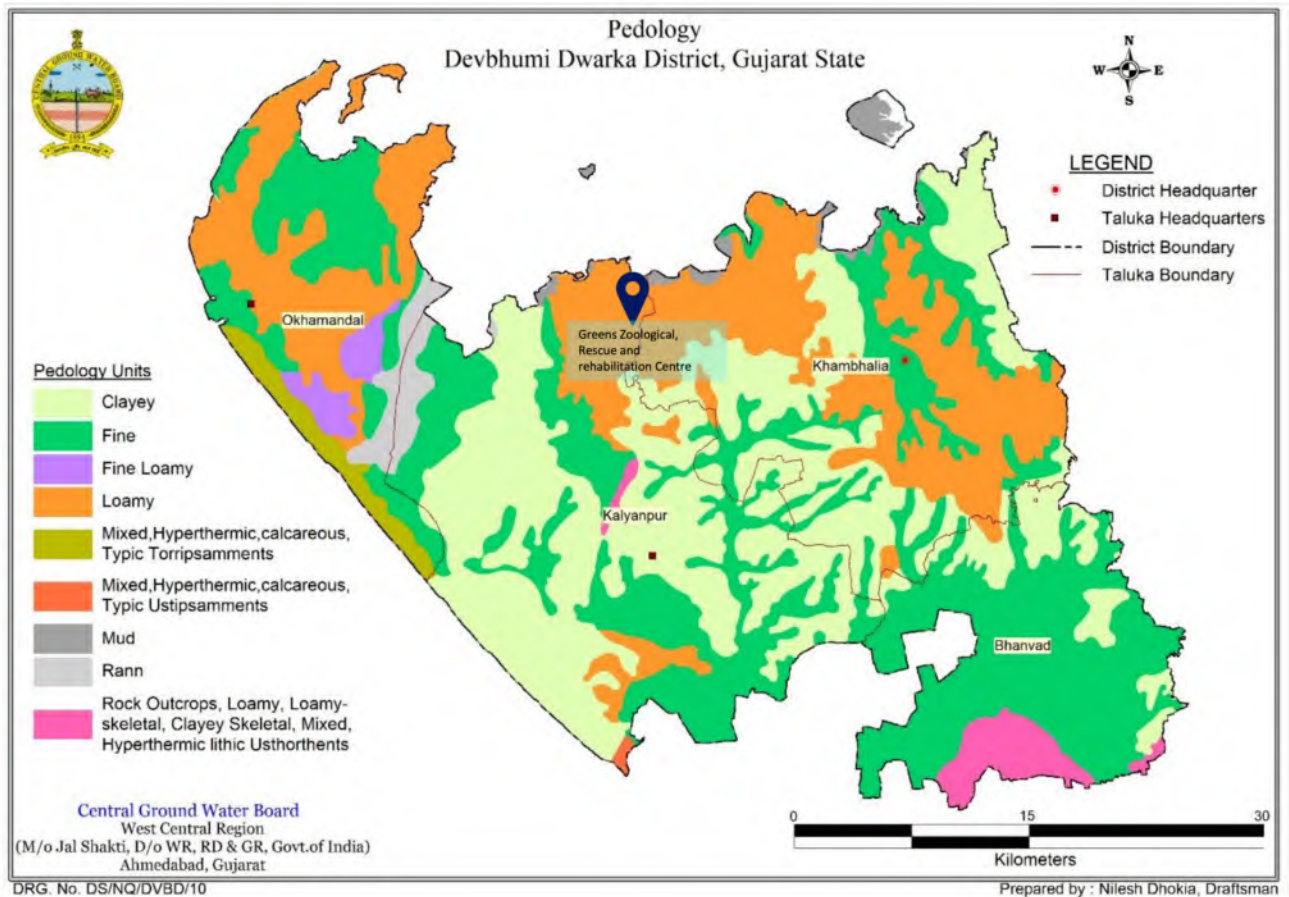


Figure 1.1: Pedology of The Dwarka district showing primarily loamy soil composition at the GZRRC location

and Alluvium”. Nearly 80% of the area is underlain by Deccan Traps, 19% by the Tertiaries and the rest by Alluvium. Hydrogeological conditions in various litho-units are described below:

As per the Aquifer Mapping and Management of Ground Water Resources Report prepared by the Central Ground Water Board, the Deccan traps predominantly consist of basaltic flows characterized by a predominantly horizontal to nearly horizontal orientation, covering an extensive geographical expanse. Within these basaltic flows, the lower massive segment lacks inherent porosity, whereas the upper vesicular segment exhibits some degree of porosity resulting from the formation of vesicles through the release of gases. Notably, both the massive and vesicular segments lack primary permeability, primarily due to the infrequent interconnectedness of vesicles. The development of secondary porosity and permeability, attributed to fracturing and jointing processes, facilitates the movement, storage, and infiltration of groundwater. The weathered zone extends to approximately 20 meters below ground level (bgl) within the surface flows, with weathered flow contacts extending to greater depths. Permeability within these zones is further augmented by the presence of fracturing and jointing. The interaction between these interflow zones and the fractured and jointed zones has given rise to a stratified aquifer system, which plays a crucial role in the occurrence of groundwater, even at considerable depths. The weathering of basalts, extending to a depth of 20 meters, and the fractured basalts beneath the weathered mantle have led to the existence of water table aquifers down to 40 meters bgl.

The depth of water level in the area ranges from 3.30 m bgl to 25.40 bgl during the pre-monsoon period, while during the post monsoon the water level ranges from 0.06 to 17.50 m bgl. The yields of the wells tapping weathered basalts are in the range of 20-100 m<sup>3</sup>/day. Those in which interflow zones have been tapped range of 100-400 m<sup>3</sup>/day.

### **Flora and fauna native to the GZRRC Site**

The flora in the GZRRC premises is currently dominated by the following families - Fabaceae, Poaceae, Asteraceae, Euphorbiaceae, Convolvulaceae, Acanthaceae, Caesalpiniaceae, Cyperaceae and Mimosaceae. The free-ranging fauna have been sighted in the GZRRC site has been provided in Annexure IV of the Master Plan document.

### **Climate at the Greens Zoological, Rescue and Rehabilitation Centre Site**

The weather details of the site and adjoining areas in the Jamnagar district has been furnished below:

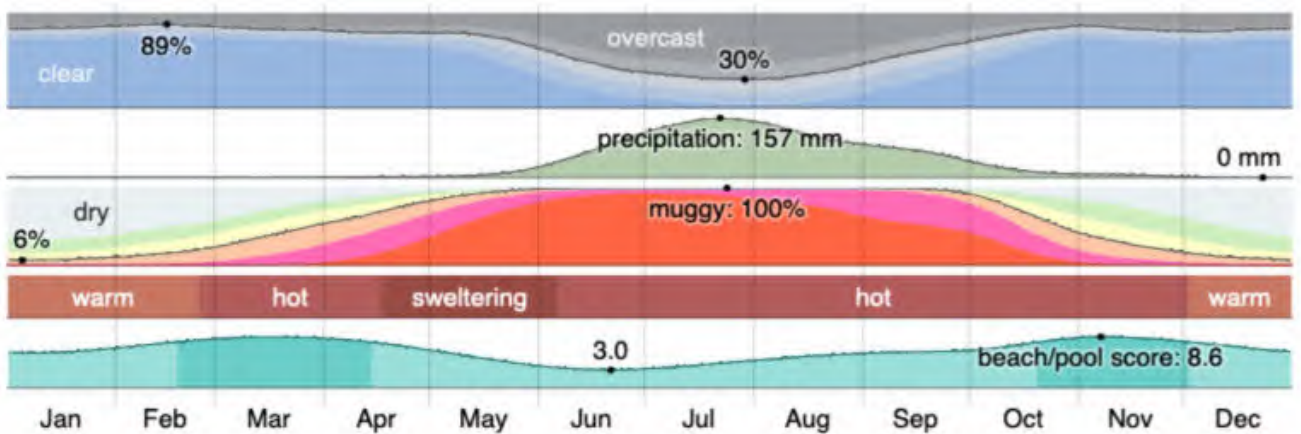


Figure 1.2: Climate patterns Jamnagar, included from accuweather.com

### Annual Temperature Patterns at the Greens Zoological, Rescue and Rehabilitation Centre Site

The weather patterns of Jamnagar can be described as mild and remains similar all across the year. With an average of 30.4° Celsius temperature, June is the warmest month and January is the coolest month averaging at 20.8°.

### Precipitation patterns at the Greens Zoological, Rescue and Rehabilitation Centre Site

The Greens Zoological, Rescue and Rehabilitation Centre site receives an annual average of 573 mm of rainfall annually. Peak Rainfall happens during the months of July, August and September. Due to the close proximity to several fresh water bodies and rivers, GZRRC is well supplied with water throughout the year. GZRRC has water desalination facility that uses seawater and brackish water as annual resources. GZRRC has sufficient water resources to cater to its present and future requirement.

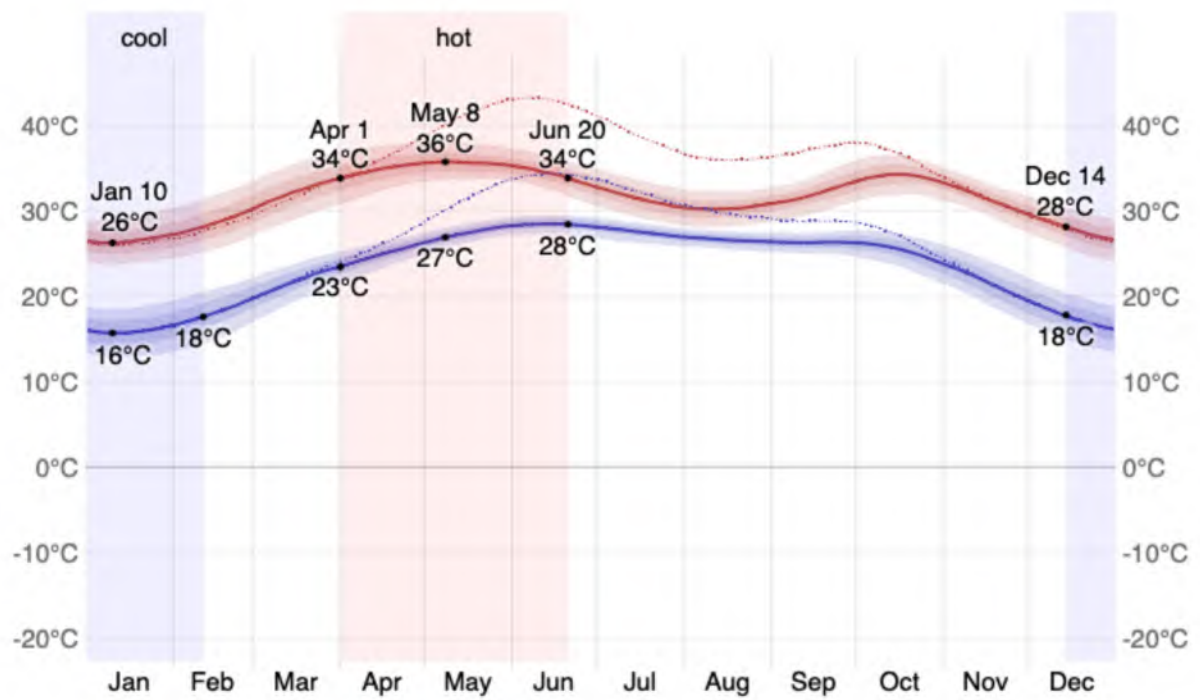


Figure 1.3: Monthly temperature pattern at GZRRC Jamnagar site, included from accuweather.com

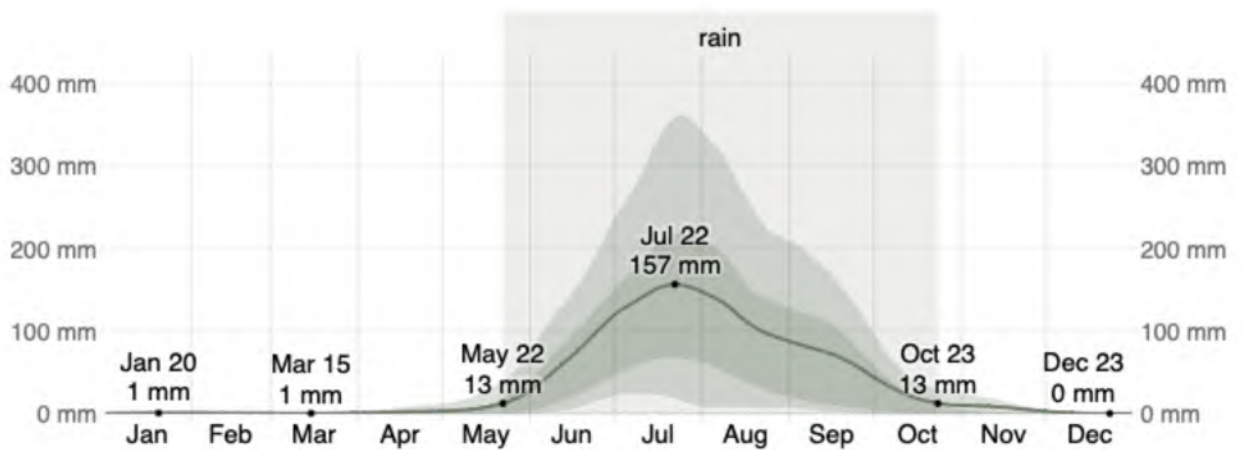


Figure 1.4: Monthly rainfall pattern at GZRRC Jamnagar site, included from accuweather.com

## Annual Humidity at the Greens Zoological, Rescue and Rehabilitation Centre Site

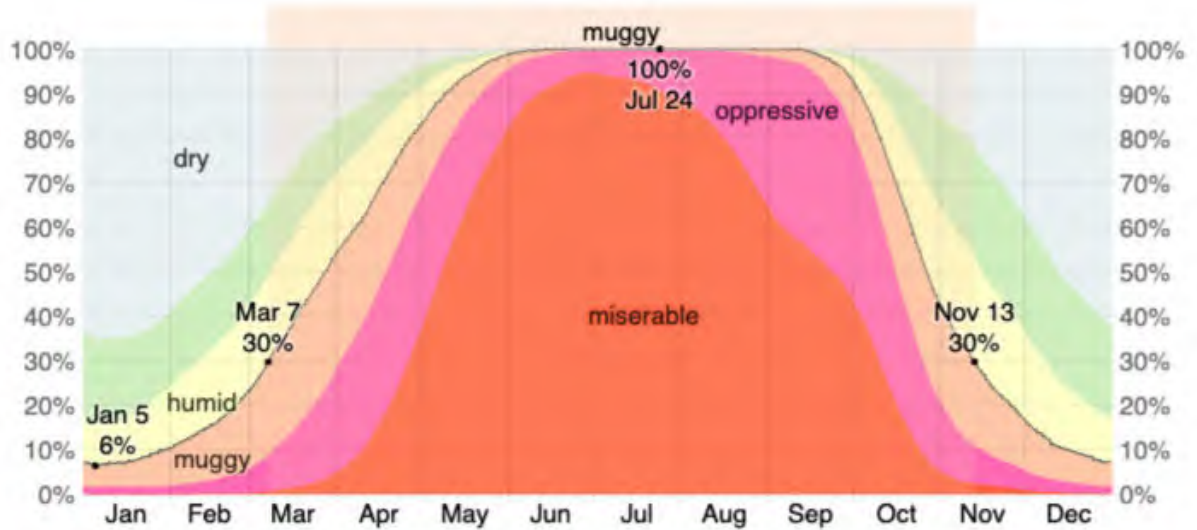


Figure 1.5: Monthly humidity levels at GZRRC site Jamnagar, included from accuweather.com

GZRRC is located 10km from the Arabian Sea near the Gulf of Kutchh. Due to the close proximity to the sea, the facility experiences high levels of humidity throughout the year. The peak humidity levels occur during the periods of June-August (80-100%) and starts tapering off by October. November-March are mostly dry with an average relative humidity ranging between 10-30%.

## Approach to the site

### Air

Jamnagar is well connected by rail, road and air. The Jamnagar airport is serviced by several airlines connecting it to international domestic airports in Mumbai, Delhi, Ahmedabad and Bangalore. The city of Rajkot is 92km away from the GZRRC site and is also serviced by several domestic airline services. The Rajkot International Airport situated 150km from GZRRC at Hirasar commenced operations on September 2023 and is set to further improve connectivity between the zoo and tourists from outside the state and the country. The

### Road

Greens Zoological, Rescue and Rehabilitation Centre is located 25kms from the city of Jamnagar. The GZRRC entrance is located at the Sir PN Road which is connected to Gujarat State Highway 27. Jamnagar is connected to several cities like Ahmedabad, Surat, Bhavnagar, Dwarka, Porbandar, Rajkot and Junagadh by a well-serviced network of national and state highways. Jamnagar being a port city that is home to some of the biggest oil refineries in the country, is well connected to all major industrial hubs in the state and the country. The city of Jamnagar is close to the culturally important cities of Dwarka and Somnath, which attract an appreciable amount of religious tourism. Therefore, GZRRC due to its unique location has the potential to become one of the important centers of *ex-situ* conservation, research and wildlife studies in the country that can attract a large number of tourists from within and outside the state. GZRRC is located in close proximity to the Khijadia Bird Sanctuary ( 37.6km), Marine National Park ( 130km) and the Gir National Park ( 212km), all of these areas draw tourists from all over the world due to their unique conservation stories. GZRRC is 485 kms from the Statue of Unity, which has recently developed as a major tourist hub in the region and GZRRC's proximity to it can be a major factor drawing more tourists to the facility. The roads are serviced by several private bus and taxi operators along with Gujarat State Road Transport Corporation (GSRTC) bus services. Tourists from various socio-economical backgrounds can use the road network to visit GZRRC.

### Rail

Jamnagar railway station is connected to several other cities within Gujarat like Rajkot, Porbandar, Ahmedabad and to other important cities like New Delhi, Chandigarh, Kolkata, Dehradun, Mumbai, Okha, Gorakhpur, Bengaluru, Hyderabad, Chennai, Vishakhapatnam and Bhubaneswar.

Table 1.1: Demography of Jamnagar

Jamnagar	Male	Female	Total
Population	248947	230973	479920
Literates	192987	160071	353058
Children(0-6)	26873	23224	50097
Average Literacy	86.90%	77.05%	82.14%

## Demography of the surrounding areas and the profile of prospective visitors

Jamnagar and surrounding areas is well-populated and has a diverse socio-cultural mixture of people. The average literacy of the region is high compared to the country average. GZRRC brings a unique conservation education experience to the area which can complement the socio-cultural milieu of the region and adds to the conservation values that this region is renowned for. Children between the ages of 0-6 years old constitute of more than 10% of the total population. This means that there is a large opportunity for GZRRC to impart conservation based awareness programmes to the future generations and garner the pre-existing cultural reverence for nature and biodiversity conservation. Moreover, Jamnagar receives a large number of tourists on their way to Porbandar and Dwarka from Rajkot. Hence GZRRC is ideally situated to disseminate it's conservation awareness messages to a large populace of receptive visitors with a rich and diverse cultural heritage.

## Legal status of the land

GZRRC is built on private land donated by the Reliance Industries. There is no legal dispute associated with the lands of any of the facilities of GZRRC.

## Sources of pollution

A railway lines passes near the site which is a potential source of noise pollution. Since GZRRC and its adjoining facilities are located in close proximity to the Reliance refinery at Jamnagar, precautions have been taken to mitigate the risk of pollution related health injuries in the animals. However, adequate sound barriers, including an 8-metre-high wall, has been built so that no animal is affected by any noise.

## 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

### Introduction

Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) has been established with a vision to provide an immersive conservation education experience to visitors while providing long-term care and welfare to all animals housed within its facilities. GZRRC has been operationalized with the vision to have a positive impact on the global efforts for wildlife conservation. The existing operational facilities of GZRRC house a large faunal assemblage of indigenous and exotic species that require constant monitoring and intensive care. GZRRC has created captive habitats that not only simulate the niche of the species housed in them, but also encourages the expression of species-typical behaviours. The specialized enclosure-specific enclosures of GZRRC ensure that the species housed in them have the opportunity to live fulfilling lives and contribute to the conservation of their conspecifics in the wild. The animal care facilities at GZRRC are complemented by the in-house veterinary infrastructure that has been developed to provide for the 24x7 monitoring and treatment of the animals under our care. This chapter provides an overview of the existing facilities of GZRRC that A holistic knowledge of the existing facilities at GZRRC, their functions and organization structure is crucial to the execution of the master plan. GZRRC is being established, and yet to open to public visitation. The satellite rescue facilities of GZRRC are presently operational at limited capacity. In this chapter, we furnish the details of the existing facilities targeted at the care of animals, education of visitors and zoo management as well as those proposed in the future.

### Animal Care Facilities

The following facilities are established at Greens Zoological, Rescue and Rehabilitation Centre as on date. All the facilities have been constructed after approval of the layout plan for GZRRC from Central Zoo Authority (CZA).

Table 2.1: Zones within Greens Zoological, Rescue and Rehabilitation Centre that are operational

S No	Zone name	Area (in Acres)
1.	Rescue and Rehabilitation Centre	72.77
2.	Conservation Breeding Centre for One-horned Rhinoceros	6.35

Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

S No	Zone name	Area (in Acres)
3.	Rescue Centre for Exotic Animals (I)	50
4.	Rescue Centre for Exotic Animals (II)	54
5.	Animal Quarantine	9.0
6.	Rescue Centre for Herbivores.	20.00
7.	Asiatic lion Care, Medical Research and Hospital	49.5
8.	Rescue and Conservation Centre for African Rhinoceros	39.68
9.	Cheetah Conservation and Research Centre (I)	3.19
10.	Satellite Rescue Centre for leopards	9.00
11.	Extension 3 of Satellite Rescue Facility ( Reptiles, Bear and Macaques)	13.0
12.	Extension 2 of Satellite Rescue Centre- Leopards	10
13.	Extension 1 of Satellite Rescue Centre for Leopards	5
14.	Cheetah Conservation and Research Centre (II)	26.00
15.	Extension of Rescue Centre for Herbivores	20.00
16.	Satellite Rescue Centre	23.00
Total	410.49	



Figure 2.1: Aerial Veiv of GZRRC Facilities Under Construction



Figure 2.2: Schematic layout map of the Rescue and Rehabilitation Centre of GZRRC

## Rescue & Rehabilitation Centre

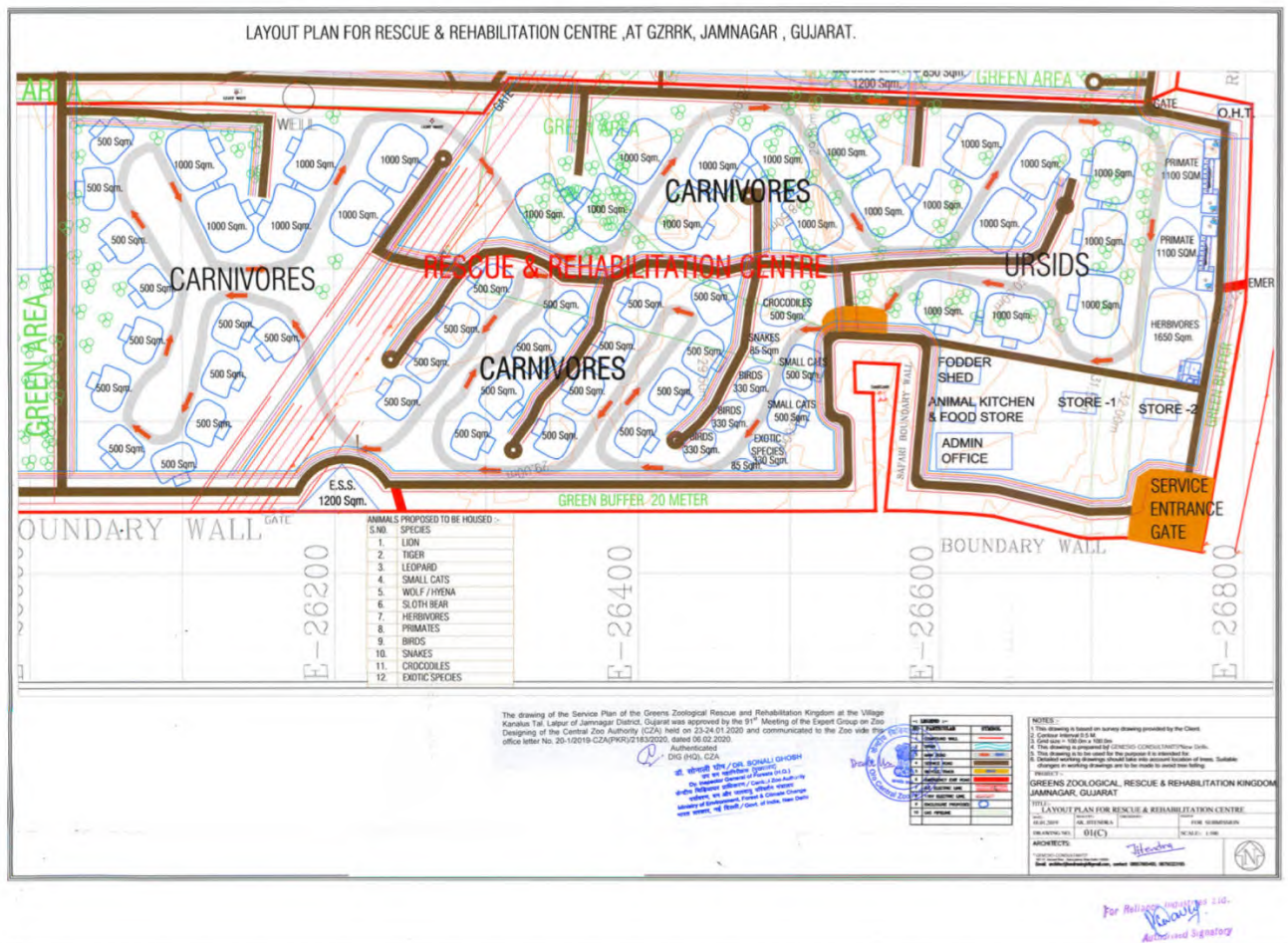


Figure 2.3: Approved Layout of Rescue and Rehabilitation Centre of GZRRK

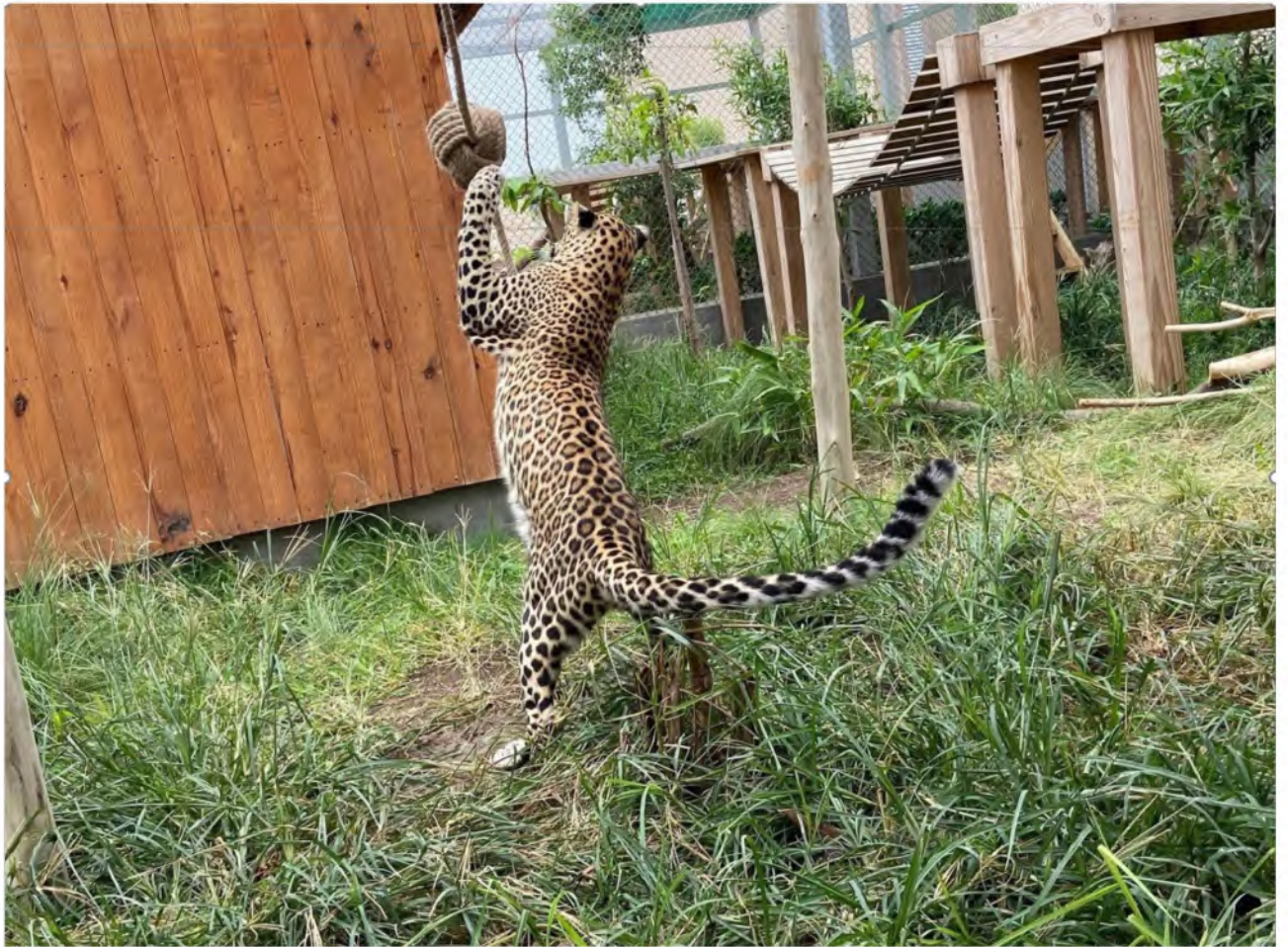


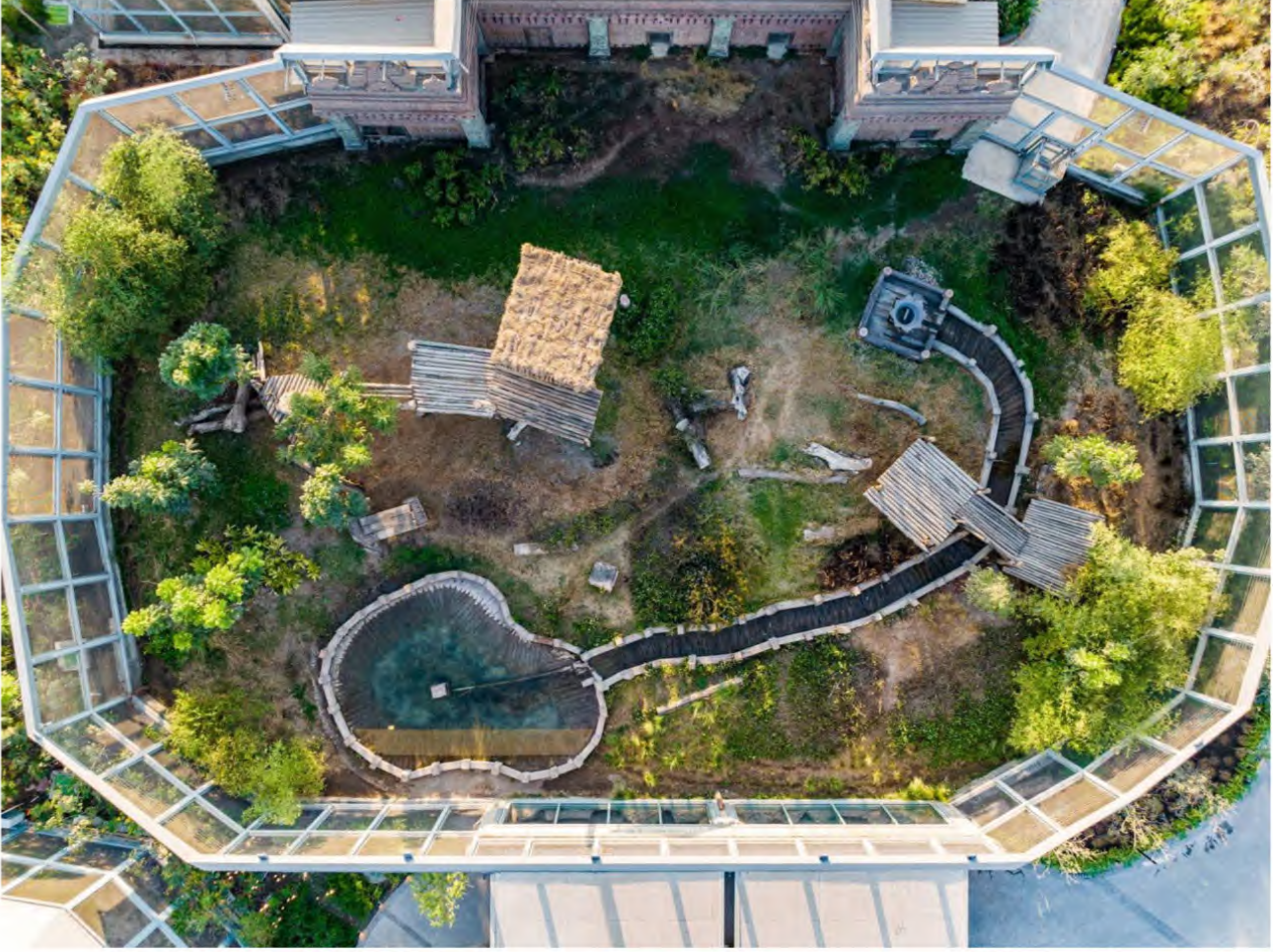
Figure 2.4: Primate Enclosures at the Rescue and Rehabilitation Facility of GZRRC



Figure 2.5: Top-Open Enclosure for Large Felids with Overhang and Power-fence at the Rescue and Rehabilitation Facility of GZRRC

GZRRC has established a Rescue and Rehabilitation centre adjacent to the proposed zoo that spans an area of 72.77 acres. The diverse topography of this facility allows for species-specific enclosure design to accommodate a large variety of species. Presently the facility houses several species of felids rescued from other *ex-situ* institutions. Based on the emerging needs of the organization, this facility will be furnished to accommodate several species of bears primates, turtles, birds, snakes and ruminants. The topography of the land is diverse and enclosure designs were chosen according to specific needs of the species which will live in them. The Rescue & Rehabilitation Centre is home to rescued felids, ursids, primates, birds and herbivores. There are 10 wings (A-K) with 78 enclosures of various designs and sizes. Each enclosure comprises of a paddock area, a kraal area, two squeeze tunnels and night cells. All paddocks are enclosed with wire mesh covering an area of at least 1000 square meters having open top, and landscaping using ferro-cement. All paddock areas have water bodies along with elevated platforms, wooden logs/tree branches are provided as enrichment. Each paddock area is enclosed on all sides with chain-link fence for safety of the animals and keepers. To ensure animal and keeper safety, all paddocks in enclosures have been provided with overhang barrier and power fencing wires that act as barriers to stop animals from escaping. As per guidelines, each animal enclosure at the facility is provided with a kraal area for housing individual animals off-display. The kraal area is furnished with species-specific furnishing and enrichment, including water pools in some cases.



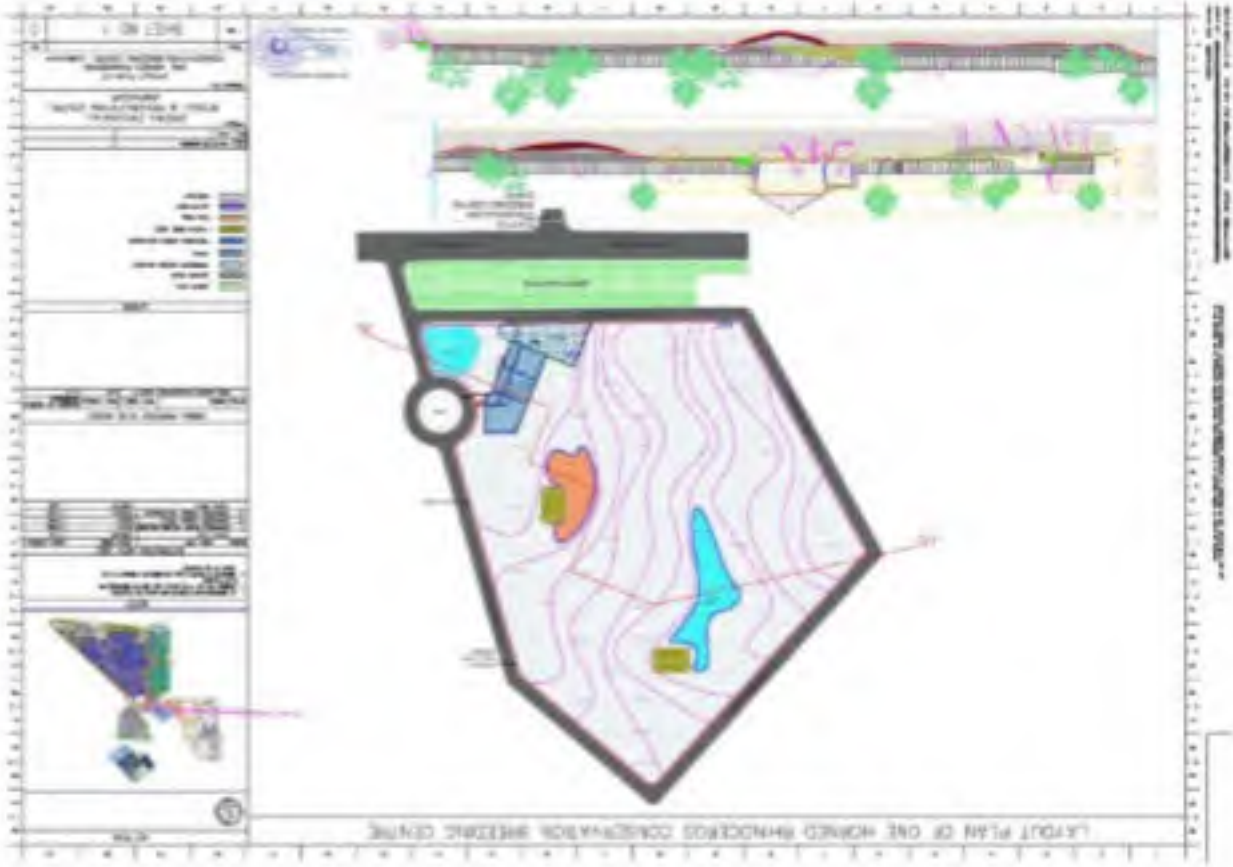


Each animal enclosure is provided with two squeeze tunnels, one from the kraal and the other from the indoor area for observations and veterinary treatments. Indoor area comprises of night cells, keeper's gallery and keeper's rooms. The indoor area is completely air-conditioned with proper ventilation and humidity control meeting all hygiene standards for housing animals. The night cells have rough Kota stone flooring that are congenial for the animals and for the ease of cleaning. Corners of cells are rounded taking into consideration the hygienic condition to be maintained. Wooden enrichment is provided in all the cells for enriching the lives of animals. The cells are provided with water and food bowls along with food chute. All doors/bars are made of stainless steel for ease of maintenance. The keeper's gallery is wide and well ventilated and provided with water and drainage system for cleaning purpose. A keeper's room is provided for maintenance and storage. A large portion of the 72.77 acres has been dedicated for green spaces to ensure an immersive and naturalistic captive environment for animals housed at the facility. An ultramodern animal Hospital & Rehabilitation Nursery and Kitchen/Nutrition Center are under construction and will be completed shortly. The facility became functional in 2020 to focus on the rescue & rehabilitation of large felids particularly leopards. The enclosures are designed keeping in view the biology and welfare of leopards with the all modern amenities. All the night cells are temperature controlled with high ceiling following the latest species-specific husbandry practices. Captive enrichment of animals at the centre encourage animals to forage for food, novel objects that elicit hunting behaviour. The

climbing structures enhance habits, olfactory stimulation via the introduction of new scents. By using these techniques, the animals are stimulated to investigate and explore their surroundings. All the enclosures have water sprinkles along with facilities for fresh water for the animals.

## Conservation Breeding Centre for One-horned Rhinoceros

Spread over an area of 6.35 acres the Conservation Breeding Centre of One-horned Rhinoceros at Greens Zoological, Rescue and Rehabilitation Centre houses one of the most vulnerable species of Indian mega-herbivores. The Conservation breeding Centre provides naturalistic paddock with features such as mud ponds, natural wallowing areas and substrate that allows for expression of the full gamut of behavioural repertoire for the species. The enclosure comprises an expansive outdoor paddock area with a water pool, mud wallowing pool and outdoor enrichment along with indoor night cells (animal holding cell/stable) with adjoining kraal. The proposed areas will be spread across 12759m<sup>2</sup>, 245m<sup>2</sup> and 253m<sup>2</sup> for the paddock, animal holding cell and kraal respectively. The night shelters shall have a special floor covering made from a special soil and mud based substrate to protect the sensitive feet of the rhinos. Each rhino shall be provided with a night cell with a feeding area and water trough. The enclosure was designed by following the “Guidelines on the minimum dimension of enclosures for housing animals of different species in Zoos” published by Central Zoo Authority. Males and females are housed separately to mitigate the risk of injury. Keeping in mind the husbandry practices for greater one-horned rhinoceroses, the flooring of the kraal will be non-abrasive and to protect their foot sole. Indoor enrichment devices like wobble logs, rubbing posts, hanging feeders etc. will be provided to the animals inside the night shelters. The paddock area is designed taking into account the natural needs of the species with vast expanses of grassland in the paddock areas. The water pool and mud wallow areas in the paddock help animals regulate the temperature, for skin health and enrichment. The water pool and the paddock area will be connected and there will be multiple opportunities for thermoregulation at the paddock area and the kraals. The enclosure is designed to have both outdoor and indoor kraals that will ensure that all animals have equal access to indoor and outdoor areas. The GZRRC team of biologists, veterinarians and keepers continuously monitor the animals to audit the enclosure features so that they meet the welfare requirement of the animals.



### Rescue Centre for Exotic Animals (I)

The Rescue Centre for Exotic Animals at Greens Zoological Rescue and Rehabilitation Centre has been designed to meet the unique biological, and socio-psychological welfare requirement of exotic animals. GZRRC is open to all animals in need of urgent medical care and rescue. The Rescue Centre of Exotic animals is designed to house species under the best possible captive management programme.

### Rescue Centre for Exotic Animals (II)

Spread across an area of 54 acres, the Rescue Centre for Exotic Animals (II) at GZRRC is one of the most advanced facility for housing exotic species of birds, herbivores, primates, rodents and carnivores. The rescue center has a green buffer spread over an area of 14.5 acres which allows it reduce its carbon footprint while also protecting the animals housed in the facility from noise and air pollution originating from surrounding areas. The facility will have animal enclosures spread across an area of 19.47 acres and separate holding areas of about 6 acres. The food storage area of the facility will be completely separate from the rest of the facilities. This satellite facility of GZRRC will be completely standalone and will be segregated from all other facilities of GZRRC to ensure biosecurity and the

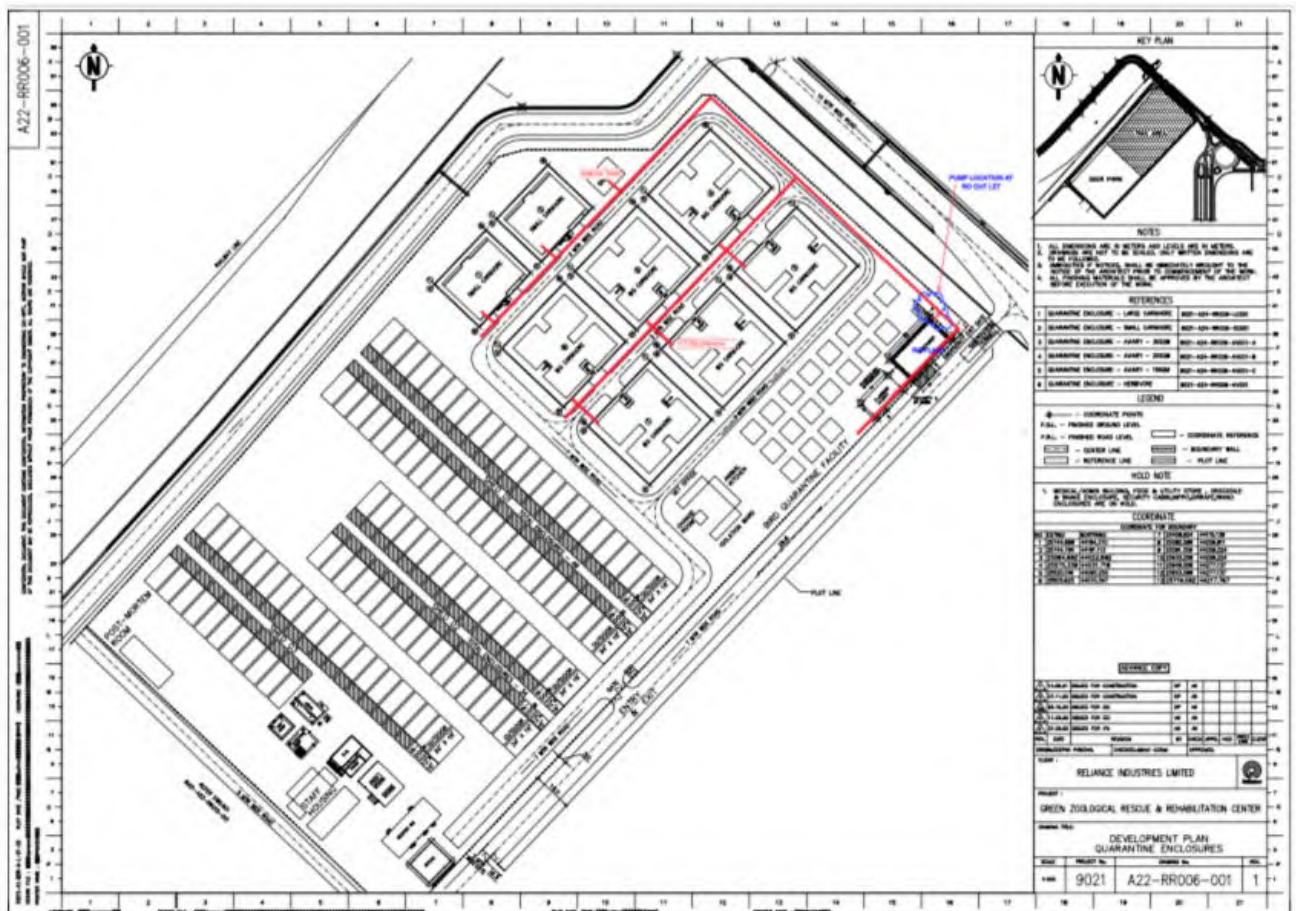
## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

spread of any zoonotic diseases. Apart from primary facilities required for the daily husbandry and management of the animals at the facility, the rescue center will also have its very own food storage area and workshop that will allow keepers to create enrichment devices that will meet the species-specific requirement of all animals at the facility. Despite being a satellite facility, the Rescue and Rehabilitation Center will have access to the finest species-specific housing, management and veterinary infrastructure and facilities for all species. The Rescue Centre will have its very own veterinary hospital and and life support system facilities that will allow veterinarians to carry out all types of prophylactic and therapeutic interventions. The facility is proposed to have its own diagnostic facilities to ensure quick processing of samples and early diagnosis of ailments before they spread to other enclosure.

### **Quarantine area for animals**

The zoo has a dedicated quarantine facility to quarantine newly acquired /sick animals of the zoo. It has been constructed on an area of 8 acres. It constitutes 5 sections, (namely Wing A, B, C, D and E) along with other facilities to house birds and reptiles. The quarantine facility of GZRRC complies with all the technical requirements for the quarantine of imported zoo animals. The quarantine facility is equipped with its own animal hospital equipped with pathology and molecular laboratory, pharmacy, animal feed preparation area and post-mortem room. The quarantine area has been kept away from the upcoming Zoo and the Rescue and Rehabilitation Area, as a separate area away from any other inhabited area. A total of 168 enclosures are present at the facility to facilitate quarantining animals such as large cats, bears, canids, small mammals, primates, reptiles, and birds.

## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities



The quarantine centre is surrounded by a 8m height boundary wall on all sides. There is single entry and exit point to the quarantine area as per the standard requirements for quarantine of animals. For quarantining animals, the quarantine section has all the requisite facilities and procedures in place. The facility has system in place to prepare quarantine areas prior to the arrival of the animals. Dedicated transport vehicles “Animal Ambulances” with provision of hydraulic unloading system is being used to transport animals in a climate-controlled stress-free environment. The quarantine area has provision to disinfect cages/crates used in transportation both before and after. Signages are provided at entry point with details of the animals to be quarantined. A change room is provided for the attending personnel with provision of all necessary personal protective equipment. Foot baths with disinfectant are provided at the entry point of all sections. Hand sanitation provision is made at all possible locations in each wing of the quarantine centre. Provision for disinfection of the transporting vehicle has also been made. Different sections are designed to maintain different species of animals with indoor night houses and outdoor paddock areas as per the space required for species following standard published guidelines. All indoor areas are provided with Heating, ventilation, and air conditioning (HVAC) system to maintain constant regulated temperature. Closed-circuit television (CCTV) cameras are installed in the entire quarantine area for round the clock monitoring of the Centre.

## **Rescue Centre for Herbivores**

The Greens Zoological, Rescue and Rehabilitation Centre has developed a Rescue Centre for Herbivores spread over an area of twenty acres. This facility has been designed to house herbivores with various biological requirements. Each paddock of the rescue centre has the capability to mould itself to meet the species-typical needs of the species housed. The focus of this facility is to provide large expansive captive habitats that can be utilized by the species to express species-typical behaviours. The herbivore rescue centre has an in-house expert veterinary team that is responsible for regular disease monitoring and prophylactic as well as surgical interventions for the animals housed in the facility.

## Asiatic Lion Care, Medical Research and Hospital



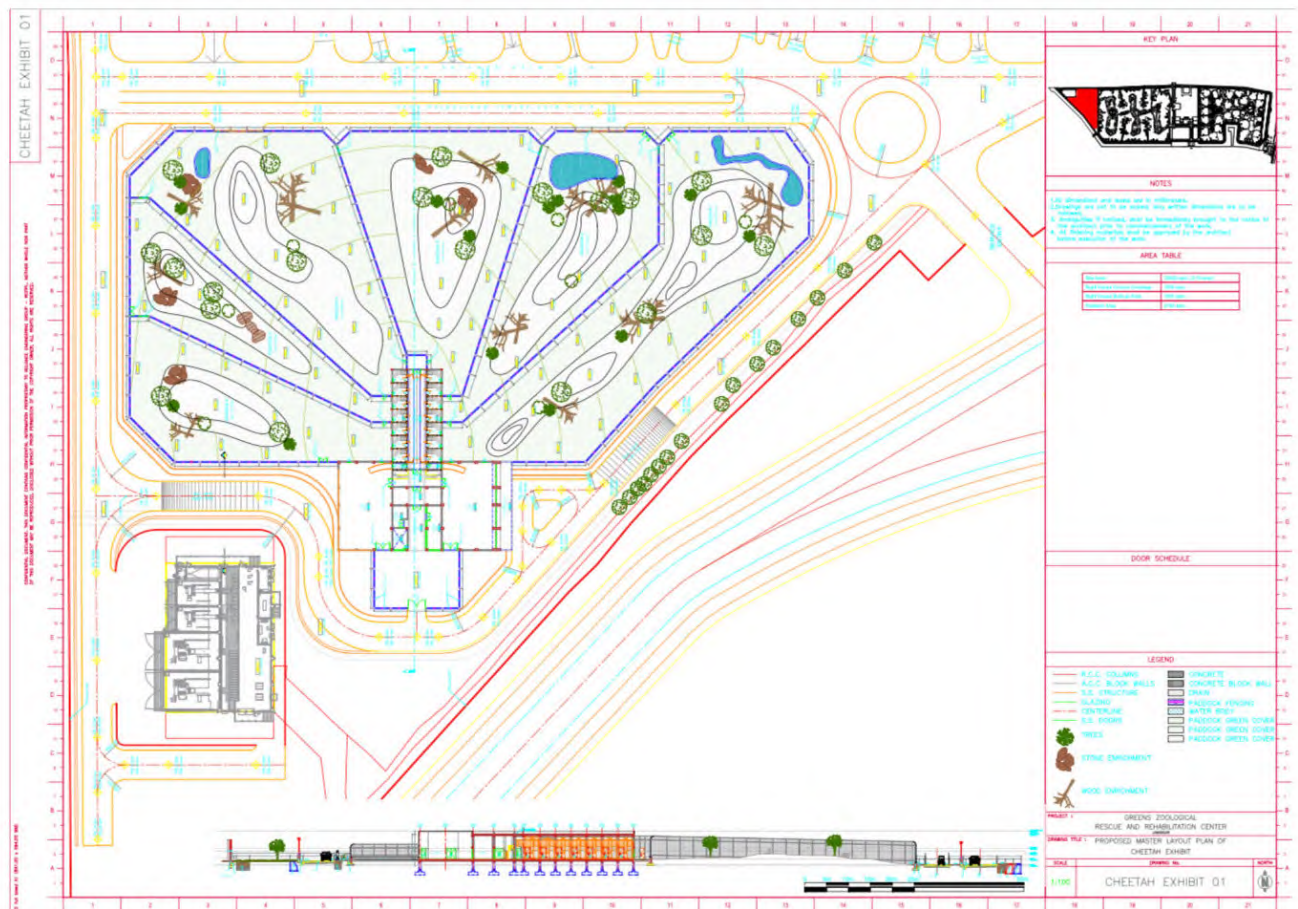
The Asiatic lion care, Medical Research and Hospital is one of the flagship programmes of GZRRC that intends to rejuvenate the Asiatic lion conservation breeding programme for the species. The Asiatic Lion Care, Medical Research and Hospital of the Greens Zoological Rescue and Rehabilitation Centre has been conceived with the sole purpose to secure the future of this charismatic species in the Indian subcontinent. Spread over an area of 40.5 acres this facility will have the capacity to house 150 Asiatic lions in four large naturalistic enclosures, each with an area of 22584 - 37808 m<sup>2</sup>. The details of the area and the facilities therein are provided in the table below. This facility is projected to be one of the finest conservation and long-term care unit for the housing and preservation of Asiatic lions. This facility will have one of the finest habitats for housing Asiatic lions in captivity so that they may express species-typical behavioural repertoire. Scientific captive animal management using modern biopsychosocial welfare monitoring will be the centre of the management

ethos at this facility. The focus of the facility will be to develop a knowledge repository for the scientific management of the Asiatic lions. In this regard a special team of researchers will carry out cutting-edge management-oriented research on emerging questions on the biology, conservation, and welfare of the species. The research team will constantly monitor the facility in specialized vehicles to observe, and record unique facets of Asiatic lion behaviour, welfare and social organization. The intensive scientific management of the species in captivity will lead to better decision-making frameworks that will inform the Gujarat Forest Department in the *in-situ* conservation of the Asiatic lions.

## **Rescue and Conservation Centre for African Rhinoceros**

Greens Zoological, Rescue and Rehabilitation Centre is cognizant of the threats to mega herbivores and the need to save them from local extinctions. In this regard, an expansive area of 39.68 acres has been developed for the rescue and conservation of the African Rhinoceros. This facility has some of the largest naturalistic enclosures for the species that simulates their natural habitat. The Rescue and conservation centre is supported by a team of subject matter experts, on-site veterinarians, para-veterinarians, and animal keepers who have been trained on the captive management of the species by several national and international experts. The Rescue and Conservation Centre for African Rhinoceros aims to rescue and conserve the species and provide an ideal habitat for the captive management of the species. GZRRC is committed to the welfare and conservation of Rhinoceros. To this effect, GZRRC has consulted with a committee of welfare experts to create detailed husbandry and management plan for the species. GZRRC has allocated two veterinarians for the task of monitoring the health and welfare status of Rhinos in the facility. A team of keepers and biologists are tasked with the daily husbandry, management and upkeep of the captive population. An in-house offsite pathology lab is already established to monitor the pathological and endocrinological health status of rhinos. GZRRC has a multi-speciality hospital within its premises that will be fully equipped with cutting-edge surgical and diagnostic equipment to handle any medical emergencies for the maintenance of the species.

## Cheetah Conservation and Research Centre (I)



The Cheetah Conservation and Research Centre has been designed to meet the long-term conservation and welfare objectives of GZRRC for the conservation of species facing severe risk of extinction. The Cheetah conservation and research is pivotal to the repatriation of Cheetahs to the Indian subcontinent. The World's conservation Union's development of a global network for species survival (IUCN, 1991) identifies the threats that endangered species face from the growing human population and its increasing consumption of natural resources. The species survival commission also recognizes the full significance of captive breeding programs to reinforce conservation efforts in the world. The *in-situ* population of Cheetah is decreasing world-wide and in India it is extinct from its geographical distribution range. There is immediate need to rejuvenate the existing population of the species in its distribution range. The species is an ideal candidate for future re-introduction projects also. The Govt. of India have took the initiative for the re-introduction program from 1970s onwards. The Supreme court of India allowed the import of African Cheetahs in year 2020 and the reintroduction program for Cheetah in India Initiated thereof. In year 2022, the reintroduction program of Cheetah was initiated in Kuno National Park in the state of Madhya Pradesh. Cheetah is the ideal species for a conservation breeding programme since they are locally extinct in the Indian subcontinent and the current extant population is facing severe extinction pressures. The Greens Zoological, Rescue and Rehabilitation Centre is committed to saving species by uniting the

## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

expertise in animal care and conservation science with the dedication and passion for nature through best practice and management and bringing education and awareness among the people. GZRRC with its state of the art facility for animal welfare and veterinary care is willing to participate in the conservation breeding of certain endangered species. The initiative of Conservation breeding of Cheetah will be in line with the long term conservation goal of the species globally. The infrastructural facility and the trained and dedicated manpower of GZRRC is well equipped for taking up the captive breeding program of the species with its international collaborators throughout its distribution range of the species. The facility has naturalistic enclosures that promote species-typical courtship and breeding behaviours of the species. The subject matter experts of GZRRC constantly monitor the health and reproductive status of the animals to ensure the long-term maintenance and proliferation of the captive cheetah population.

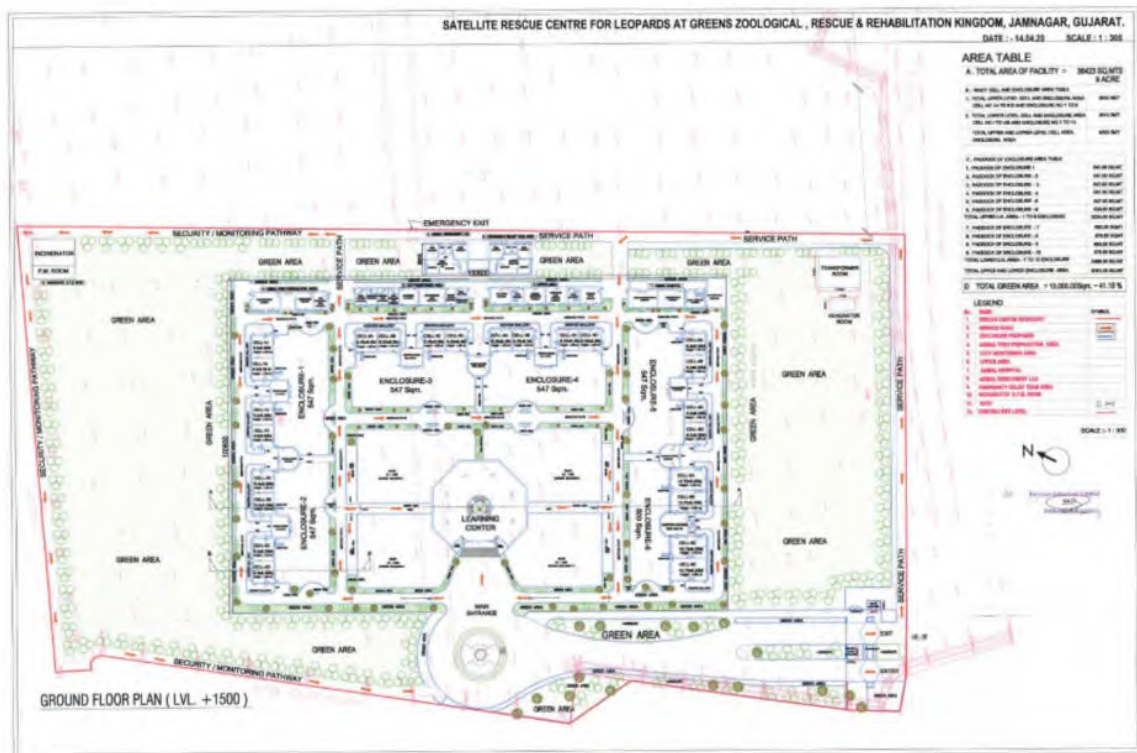
### Satellite Rescue Centre for Leopards



The Satellite Rescue Facility is built in a nine-acre area. The facility became functional in 2020 to focus on the rescue & rehabilitation of large felids particularly leopards. The enclosures are designed keeping in view the biology and welfare of leopards with the all modern amenities. All

## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

the night cells are temperature controlled with high ceiling following the latest species-specific husbandry practices. Enrichment interventions for animals at the centre encourage them to forage for food, novel objects that elicit species-typical behaviours. Other Manipulable and Sensory enrichment devices are used to elicit species-typical behaviour repertoire in captive animals. By using these techniques, the animals are stimulated to investigate and explore their surroundings. All the enclosures have water sprinklers along with filtered potable water for drinking.

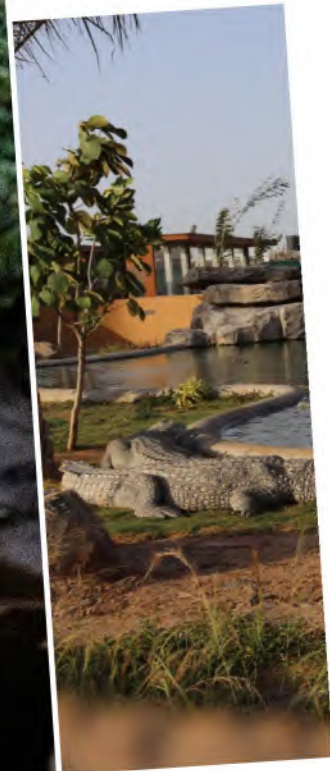


### Extension 3 of Satellite Rescue Facility (Reptiles, Bears and Macaques)

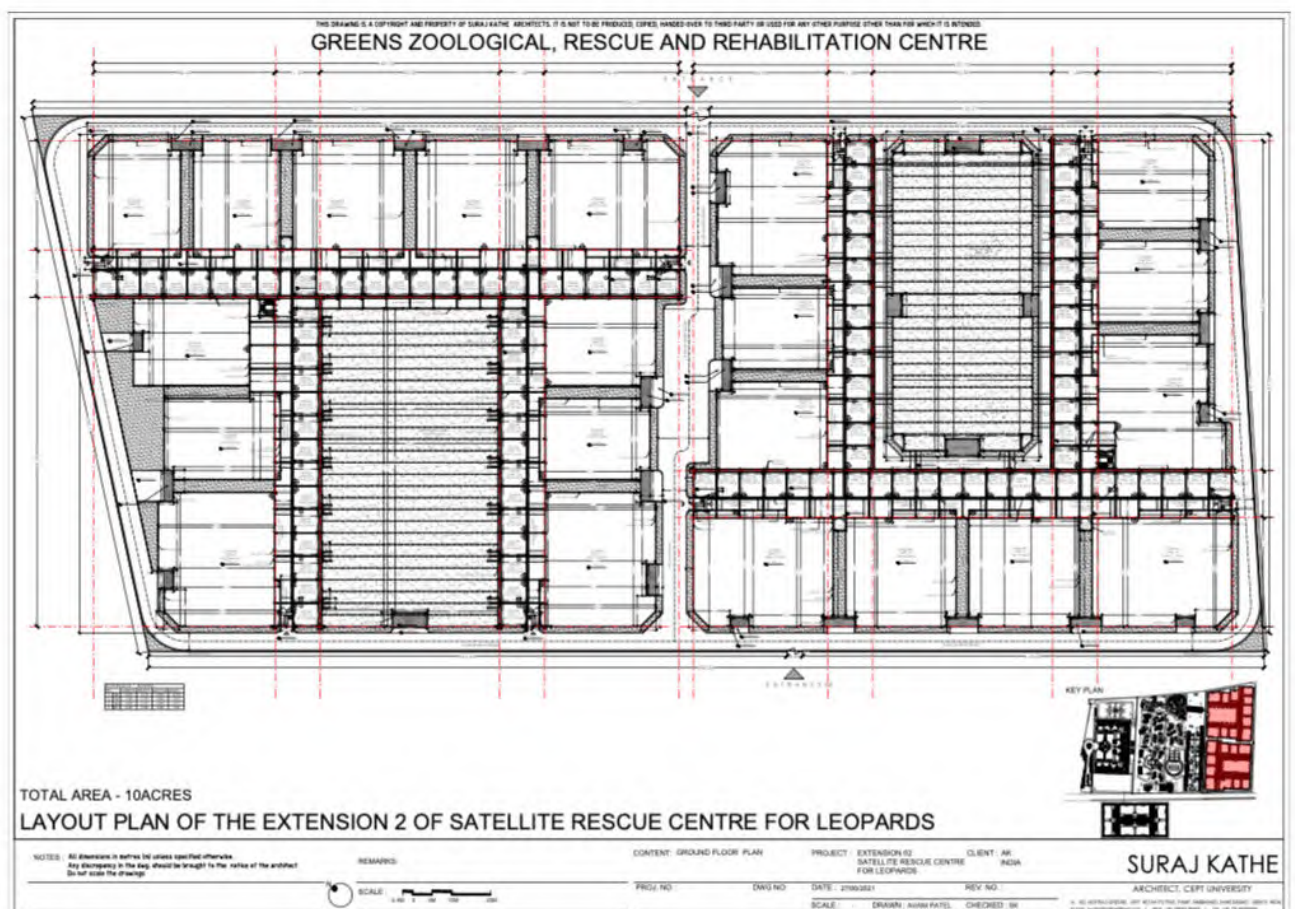
The Extension of Satellite Rescue Facility (Reptiles, Bears and Macaques) is being built in a 13-acre area adjacent to Satellite Rescue Facility. The facility is being built to accommodate rescued bears, macaques and reptiles (crocodiles). Currently facilities for bears and crocodiles are completed. The water pools in these enclosures are provided with water filtration system and pool heaters to control water temperatures in winters. Provisions are made to provide the crocodiles to have access to heating sources by providing heat through IR-A radiation lamps as well as heated water.



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## Extension 2 of Satellite Rescue Centre for Leopards



The Extension 2 of the Satellite Rescue Centre for Leopards has been developed to house rescued leopards that have been victims of man-animal conflict. At this Rescue centre, these leopards are housed at large naturalistic enclosures that mimic their natural habitat, and provide ample opportunities to express species-typical behaviour repertoire. The facility features some of the finest leopard enclosure designs that ensure optimum welfare for all individuals housed in them. The satellite rescue centre has provision to house leopards in a stress-free captive habitat where they can express the full gamut of their behavioural repertoire.



### **Extension 1 of Satellite Rescue Centre-Leopard (5 acres)**

The Extension of Satellite Rescue Facility is built in a 5-acre area adjacent to Satellite Rescue Facility. The facility is an extension of the Satellite Rescue Facility to accommodate rescued leopards. The facility constitutes eight large enclosures for housing rescued leopards. Each enclosure comprises one large paddocks with five-night cells. Paddock area for each enclosure is 1130 m<sup>2</sup> and constitutes enrichment with many climbing structures for the animals. Every night cell is connected to an outdoor area. A kraal is provided to house individual animals. Squeeze tunnels for observing and treating animals are provided for each enclosure. All the night cells are air-conditioned with enrichment provided.

### **Satellite Rescue Centre for Leopards**

The Satellite Rescue Centre for Leopards aims to be one of the finest rescue centre for leopards involved in man-animal negative interactions. This satellite rescue facility for leopards is designed



Figure 2.6: Complex and stimulating enclosure design for leopard Rescue Facility of GZRRC



Figure 2.7: Stimulating enclosure design for Bear Welfare



Figure 2.8: Layout of the Satellite Rescue Facility (Reptiles, Bears and Macaques)

keeping in mind the species-typical and behavioural requirement of leopards. The facility has two extensions, with a combined capacity to house over 500 large carnivores. The Satellite rescue centre uses modern concepts of enclosure design to encourage the expression of species-typical behaviours in leopards. The staff at the facility are trained to use positive reinforcement conditioning to provide optimum care and welfare to the animals housed. The husbandry and management routine employed at the facility is species-specific but tuned frequently to meet the individual, health and welfare requirement of animals. Here enrichment protocols are integrated with the husbandry programme and complements the diet of animals. A combination of enrichments are used to engage the animals and rotated based on the findings of the behaviour monitoring programme.

### Central Laboratory For Pathology, Virology and Molecular Genetics

The Greens Zoological, Rescue and Rehabilitation Centre has established one of the finest Central Laboratory for Pathological, Virological analysis and Molecular Genetics. The laboratory is fully equipped with state-of-the-art equipment for the meet the disease monitoring and research goals of GZRRC. GZRRC veterinarians can send samples for disease diagnosis, pathological tests and molecular genetics studies and receive the results without any delay. The laboratory is operational with the strictest bio-security protocols that ensures the safety of all personnel working at GZRRC. The laboratory staffed with a team of pathologists, molecular biologists, endocrinologists, senior veterinarians and epidemiology experts, who work round the clock to develop disease monitoring protocols to monitor the animal population for emergent and extant diseases as a preventive and therapeutic tool of modern zoo management. The Central Laboratory is expanding based on the growing demands of GZRRC and will cater to all current and future needs of the facility and partner organizations.

### Veterinary Hospital facilities:

GZRRC has developed a veterinary hospital that has modern diagnostic and therapeutic facility for the treatment of animals under its care. The hospital is staffed by a dedicated team of veterinarians, paravets, and helpers.



Figure 2.9: Veterinary, Surgical, Pathological Diagnostic Laboratory of GZRRC

## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

A multi-speciality veterinary hospital with all the necessary equipment along with ICU units, operation theatre, in-patient ward, Post-mortem room and incinerator is operational at the Satellite Rescue Facility and in the Quarantine Unit. The following equipment are present in the veterinary hospitals.

Table 2.2: Veterinary Medical Disease Diagnosis Equipment Operational at GZRRC

Sl No	Equipment name	Description	Number of Units
1	Gaseous Anaesthesia Machine	Portable anaesthesia machine crucial for Prophylactic, Diagnostic and Therapeutic interventions	2
2	CT Scanning machines	Used for diagnostic imaging	3
3	MRI scanning machine	Used for diagnostic imaging	2
4	Portable X-ray scanner	Used for diagnostic imaging for preventative care	3
5	OT equipment	Used for performing surgeries and other therapeutic interventions for small and medium sized animals	4
6	Ultrasonography machines	Used for performing diagnostic imaging for prophylactic and therapeutic interventions	5
7	Dental Surgery Kit	Carry out dental surgery and diagnostic interventions	6
8	CBC machine	To conduct pathological diagnostic blood tests for disease control and prevention	7
9	Tranquillizing equipment	To tranquilize animals for safe medical interventions	4
10	Diagnostic Laboratory	To conduct pathological diagnostics for blood serum, urine analysis and hormone analysis	3



Figure 2.10: Pharmacy of GZRRC equipped with advanced inventory management software

## Feed

GZRRC takes special care regarding dietary requirements of all animals housed at its facility. Effort and time are given to ensure all animals are catered for their nutritional needs. GZRRC also takes into account the types and amounts of food, methods of presentation, and feeding frequencies that are selected based on the physical and behavioral attributes of the animals/species at its facilities. Utilizing diet sheets, documentation of animal's diet in a daily food record is done for assessing nutritional needs and individual preferences. Diet sheets ensure consistency and are reviewed regularly.



Figure 2.11: Food processing area for GZRRC

Along with feeding frequency, food selection and waste are documented which can be useful tools in monitoring diet of animals. Special care is taken while presenting food is presented to the animal and ensuring that competition between animals is mitigated with enough feeding stations. Also, the animals are encouraged to forage and explore for hidden food which is part of the enrichment programme of the animal. Visitor feeding is prohibited at GZRRC and only the concerned animal keeper is allowed to feed/interact with animal. Clean and fresh water is accessible to animals all the time. Strict personal hygiene is practiced by the keeper when preparing food to avoid compromising both staff and animal health. This helps prevent contamination and keeps the food clean, fresh and hygienic. Safety protocols are always followed when feeding animals and experienced staff members always oversee animal feeding all time.



Figure 2.12: Cold Food storage area of GZRRC

## Waste Management

The GZRRC has a comprehensive management system to responsibly handle waste generated within its premises. All sewage water is sent to a Sewage Treatment Plant which is purified and maintained as per the Pollution control board norms. The treated water used to maintain the vast green space of GZRRC. Solid waste is segregated at source – biodegradable waste is used in composting, PET bottles are sent to R-Elan which converts them to fabric and other waste such as wood, metal are sent to a designated yard where the materials are stored for later re-use. All GZRRC have storm water drains which are connected to local reservoirs which aid in ground-water recharge.

## Security System

GZRRC has been designed with multiple layers of security control measures to; prevent, detect, identify, and respond to any security risk and further restore facility operation to normalcy. GZRRC security is designed with world-class integrated security measures to provide a safe and secure environment for all animals and staff working at site. The outer perimeter is guarded by robust boundary wall, which is secured by Reliance Industries Limited (RIL)-Global corporate security team with latest Close Circuit Television (CCTV) surveillance and intrusion detection system based on edge analytics. Additionally, all the entrances and exits are guarded by CISF personnel. GZRRC sites are located within the Reliance industries complex perimeter having a separate boundary wall with concertina on top, smart electric fence, security watch towers, fully automated sliding gates, well trained security team, access control turnstiles, CCTV surveillance and monitoring system.



Figure 2.13: Animal ambulances of GZRRC

Sites have limited number of access points to channelize human and vehicle movements with security checkpoints. The entire GZRRC facility is well protected, preventing unauthorized person from entering the premises and animals to escape. All GZRRC sites are fitted with integrated operation center with dedicated security, veterinary & human doctor, and maintenance personnel available round the clock. This integrated operation center is equipped with cutting-edge surveillance cameras and

## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

sensors to monitor the environmental changes if any. For example, the integrated operation center monitors and responds to all panic alarms picked up by the vibration sensor meter installed in the animal enclosures. The integrated operation center has CCTV monitoring and surveillance system that is being monitored by trained security personnel 24X7. All GZRRC sites are installed with multiple layers of authentication to ensure only authorized person can get access at designated part of the facility with biometric access control mechanism. All the doors are connected to a more comprehensive security monitoring system. Door sensors with alarms are triggered if any door kept open for a long duration or an access card have been swiped multiple times at any facility door.



Figure 2.14: Animal restraining and tranquilization equipment at GZRRC

Security personnel deployed at GZRRC sites are well trained in efficiently handling man and material movement at the respective site. All the entry and exit points of the facility are checked during regular and silent hours. Security team works in the direct coordination with operational control centre using RT walkie-talkie sets to record and escalate any distress situation. The GZRRC has a Quick Reaction Team (QRT) of security personnel, equipped with rescue equipment available round the clock at all the critical localities. Security personnel at GZRRC ensure strict bio-security protocols implementation at the sites to prevent disease organisms from spreading from infected premises to other premises. Protocols may include restricted entry, use of disinfectant at the entries, and personal protective equipment (PPE), as well as concepts such as line of separation (LOS) to prevent contamination.

## Carcass and Bio-medical waste disposal

All bio medical waste and animal carcasses are safely disposed through incinerator within the premises of the GZRRC. The incinerator has an 800 kilogram capacity at one instant at a temperature of 85°C. A detailed log is maintained at the incinerator that records the amount of matter incinerated and the amount of waste generated. GZRRC has implemented strict protocols for the dumping of waste generated from the incinerators in designated pits. The entire protocol of Solid waste disposal and biomedical waste management at GZRRC is centred around the concept of pollution management and maintaining the ecological balance of the area surrounding GZRRC.

## Research

GZRRC has a comprehensive Research Policy that has been designed with the vision of proliferation of Zoo biology as a significant contributor to conservation sciences. GZRRC has developed Chief Leadership Teams constituting of Subject matter experts, biologists, curators and Zoo veterinarians, who will be guiding the institution through its research goals. The Chief leadership teams The primary objective of the GZRRC research team is to develop a knowledge base for a holistic understanding of animal welfare. The research team has identified key topics for the conservation and management of key endangered species using a “One-Plan approach” for *ex-situ* and *in-situ* collaboration for the common goal of biodiversity conservation. The GZRRC is collecting data on various aspects of captive animal behaviour welfare and cognitive functions. The existing data is being analysed and results will be published shortly. Conservation breeding The GZRRC has proposed a Conservation Breeding Centre for the One-horned rhinoceros (*Rhinoceros unicornis*). Once the enclosure designs are approved by the Central Zoo Authority, the process of acquiring the animals will be initiated. Education and awareness The Zoological Park is yet to be established – the GZRRC will start the education and awareness programs once the Zoological Park is established.



Figure 2.15: Water treatment facilities at Aquatic Reptile Rescue Facility of GZRRC

### **Animal welfare monitoring programme**

Greens Zoological, Rescue and Rehabilitation Centre is one of the leading institutions that has borne the flag of animal welfare across all its operations, that has been optimized captive animal management across the institution and set the gold standard for maintaining the welfare of animals under its care. GZRRC takes a systematic approach to ensuring proper animal welfare for all animals housed under its care. GZRRC is home to a large assemblage of species that require multifarious expertise and technical capabilities to manage their husbandry and welfare practices. Welfare management of species requires in-depth knowledge of species-biology and captive husbandry practices. The first step to our animal welfare programme is gathering reliable knowledge about the species biology of the animal under consideration. The process of animal welfare starts prior to animal acquisition, enclosures are designed to mimic functional natural habitats of species and At GZRRC, care is taken so that the enclosure design and captive husbandry practices for each species is integrated with the biopsychosocial welfare requirement of animals. This requires, keepers and biologists to work in tandem to observe and assess the welfare indices of captive animals to tune the extant management practices for the long-term welfare Using our digital zoo management software, keepers and biologists record and report the responses of animals to management practices and their activity levels. This report is shared with panel of nutritionists, veterinarians and biologists for them to assess the response and create a modified. The second step for ensuring animal welfare is to design a captive habitat that encourages species to express species-typical behaviour repertoire. The

## Advanced water treatment facilities for reptile enclosures

GZRRC has access to fresh water supplies throughout the year due to its close proximity to several natural and artificial water bodies nearby. GZRRC is committed to fresh water preservation, hence all aquatic enclosures for reptilians, amphibians and marine mammals are equipped with stand-alone water purifying units that are able to reuse the water for several cycles before it can be re-purposed at other parts of GZRRC. GZRRC follows a strict reduce, reuse, and recycle policy for all natural resource utilization in its facilities.

## Conservation breeding programmes at GZRRC

The GZRRC has proposed a Conservation Breeding Centre for the One-horned rhinoceros (*Rhinoceros unicornis*). The enclosure design is under review by the Central Zoo Authority. Further, the GZRRC is also planning to establish a Avian Conservation and Breeding Centre and a Large Cat Conservation and Breeding Centre. The GZRRC will strive to conserve many more species through conservation breeding programmes, in consultation with the Central Zoo Authority and the respective State Forest Departments. The Greens Zoological, Rescue, and Rehabilitation Centre has identified the following Indigenous and exotic species for its flagship conservation breeding programme.

### Indigenous species

- Asiatic lion (*Panthera leo persica*)
- Greater one-horned rhinoceros (*Rhinoceros unicornis*)
- Desert fox (*Vulpes vulpes pusillia*)
- Desert cat (*Felis lybica*)
- Caracal (*Caracal caracal*)
- Indian wild dog (*Cuon alpinus*)
- King cobra (*Ophiophagus hannah*)
- Pallas's cat (*Otocolobus manul*)
- Slender Loris (*Loris tardigradus*)
- Bengal slow loris (*Nycticebus bengalensis*)
- Clouded leopard (*Neofelis nebulaosa*)
- Snow leopard (*Panthera uncia*)
- Rusty spotted cat (*Prionailurus rubiginosus*)
- Leopard cat (*Prionailurus bengalensis*)
- Smooth-coated otter (*Lutrogale perspicillata*)
- Gray wolf (*Canis lupus pallipes*)
- Asiatic wild ass (*Equus hemionus khur*)
- Great Indian bustard (*Ardeotis nigriceps*)
- Lesser florican (*Sypheotides indicus*)

## Chapter 2 Appraisal of Present Arrangement and Constraints of Greens Zoological Rescue and Rehabilitation Centre Facilities

- White-rumped vulture (*Gyps Bengalensis*)
- Red-crowned roof turtle (*Batagur kachuga*)
- Golden Langur (*Trachypithecus geei*)
- Fishing cat (*Prionailurus viverrinus*)
- Asian golden cat (*Catopuma temminckii*)
- Mouse deer (*Moschiola indica*)
- Gharial (*Gavialis gangeticus*)

### Exotic species

- Spix's Macaw (*Cyanopsitta spixii*)
- St. Vincent's Parrot (*Amazona guildingii*)
- Lear's Macaw (*Anodorhynchus leari*)
- Okapi (*Okapia johnstoni*)
- Przewalski's horse (*Equus ferus przewalskii*)
- Siberian Tiger (*Panthera tigris altaica*)
- Sumatran Orangutan (*Pongo abelli*)
- Tapanuli Orangutan (*Pongo tapanuliensis*)
- Gorilla (*Gorilla sp*)
- Chimpanzee (*Pan troglodytes*)
- Bonobo (*Pan paniscus*)
- Golden lion tamarin (*Lentopithecus rosalia*)
- Southern White Rhinoceros (*Ceratotherium simum simum*)
- Eastern Black Rhinoceros (*Diceros bicornis michaeli*)

Greens Zoological, Rescue and Rehabilitation Centre has earmarked over 20 acres of area for the proposed conservation breeding programme for the aforementioned species. In the near future, GZRRC aims to build the necessary infrastructure for the long-term breeding of captive populations for these species that will be followed by repatriation to reclaimed habitats.

### Education and awareness programmes at GZRRC

The Zoological Park is yet to be established – the GZRRC will start the education and awareness programs once the Zoological Park is established. An education policy has been formulated which has been elucidated in Chapter IV (Future Action Plan).



## Part-II





### 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

#### Objectives

The objectives of the Greens Zoological, Rescue and Rehabilitation Centre have already been explained in Chapter I. For the sake of convenience, they are being reproduced here as follows: -

- The primary objective of establishing this Greens Zoological, Rescue and Rehabilitation Centre is to complement and strengthen the national efforts in conservation of the rich biodiversity of the Gujarat and our country.
- Greens Zoological, Rescue and Rehabilitation Centre aims to conserve endangered species by breeding, increase healthy population by rehabilitating them back in the wild.
- Providing opportunities for scientific studies useful for conservation of wildlife and creation of database for sharing between the state and central government.
- To collect and collate the scientific data on the biology, behaviour and healthcare of various species of wild animals housed at the Greens Zoological, Rescue and Rehabilitation Centre and use the same in future management of the Greens Zoological, Rescue & Rehabilitation Centre.
- These data will also help in wildlife management.
- To create among the visitors' compassion towards wild animals through better understanding of the linkages of long-term survivals of various species of wild animals to availability of fertile soil, potable drinking water and pollution free environment.
- To assist in conservation of various species of wild animals and their habitat by sensitizing the people about the benefits of adopting sustainable life styles.
- To provide the opportunities to the public to see the wild animals' close quarters, so the Greens Zoological, Rescue and Rehabilitation Centre will have a sensational value not only for general public but for children also. This will certainly bring the happiness movement in their life.
- Greens Zoological, Rescue and Rehabilitation Centre will act as a Rescue Centre for orphaned/ seized/ accidental/ injured/ burnt/malnourished animals from human habitation and wild.
- This Rescue Centre shall provide shelter to the animals which have strayed out of their habitat and cannot be released back in the wild.
- To educate and aware zoo visitors for conservation, protection and to explain them their role in balancing the Eco-System.
- To provide rescue facility to injured wild animals through best veterinary services.

### Chapter 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

- Conservation breeding of endangered species of wild animals, available within central highlands of India.
- To provide housing and upkeep to the orphaned animals of endangered species rescued from the wild.

The proposed Greens Zoological, Rescue and Rehabilitation Centre will provide an opportunity to strengthen the initiatives taken for conservation of rich biodiversity of the state.

#### **Activities to achieve the objectives:**

- (i) Housing, upkeep and display of various species of wild animals in naturalistic enclosures that meet their biological and behavioral requirement and ensure their health and longevity.
- (ii) The Greens Zoological, Rescue and Rehabilitation Centre shall provide visitors an opportunity to see the animals in their near natural habitat from close distance.
- (iii) Maintaining genetically and biologically viable group of each species in the collection of the Greens Zoological, Rescue and Rehabilitation Centre.
- (iv) Ensuring for the animals in the collection of the zoo the availability of highest quality upkeep, feeding and health care.
- (v) Maintaining the number of animals in each enclosure within carrying capacity of the enclosure, according to the prescribed guidelines of CZA.
- (vi) Limiting the collection of the wild animals at the zoo only to such species which can thrive well and live comfortably within the climatic conditions of the plan area.
- (vii) Collaborating and cooperating with other zoos, particularly Sakkarbaug Zoo, Junagadh, Sardar Patel Zoological Park at Kevadiya, and other zoos in India or abroad in exchange if any, loaning and transfer animals for providing compatible mates to the animals of all the species of wild animals housed at the zoo.
- (viii) Collection and collation of data on the animal upkeep, health care and breeding of endangered species from various zoos and reputed institutions working in this field.
- (ix) Seeking help of veterinary colleges and universities in diagnosis and treatment of diseases affecting the animals housed in the Greens Zoological, Rescue and Rehabilitation Centre.
- (x) Ensuring availability of necessary finances and infrastructural facilities necessary for carrying out the activities listed above.

### **Mission:**

The Greens Zoological Rescue and Rehabilitation Centre is committed to saving species by uniting our expertise in animal care and conservation science with our dedication in inspiring passion for nature through best practices of management and bringing education and awareness among people.

### **Vision:**

For establishment of the Greens Zoological, Rescue and Rehabilitation Centre, the facility shall have following vision:

- (i) Greens Zoological, Rescue and Rehabilitation Centre aims at making the facility as per International standards following the modern trend of design as open and naturalistic and eco-friendly.
- (ii) No activity would be undertaken by the Greens Zoological, Rescue and Rehabilitation Centre that disturbs the natural landscape of the area. The design of animal enclosures and the support infrastructure would be such that they can merge fully in the environment of the Greens Zoological, Rescue and Rehabilitation Centre.
- (iii) Greens Zoological, Rescue and Rehabilitation Centre shall house only such species which can be provided quality life of adequate longevity so that they can breed and lead to self-sustaining and genetically and behaviorally viable population at the zoo.
- (iv) Greens Zoological, Rescue and Rehabilitation Centre shall maintain highest standards of educative signage and interpretation facilities at the animal enclosures to enable the visitors in having a rewarding experience at the zoo.
- (v) Greens Zoological, Rescue and Rehabilitation Centre shall endeavour to maintain and enhance the naturalistic and aesthetic value of the area.

To meet the above goals of Greens Zoological Rescue and Rehabilitation Centre, we have prepared the following policies that will align GZRRC with its vision and mission goals.

### **Conservation Policy of Greens Zoological Rescue and Rehabilitation Centre**

Since the twentieth century, zoos have become flagbearers for *ex-situ* conservation of biodiversity (Gupta and Chakraborty 2005; Gupta 2008). Under the umbrella of prominent zoo associations, global conservation breeding programmes run by zoos have saved several endangered species from the jaws of extinction. Indian zoos and conservation breeding centres have played a crucial role in creating an insurance policy for endemic species through its own conservation breeding programme. Unfortunately, the rise in anthropogenic pressures on wildlife and habitats have posed new challenges to the long-term future of biodiversity conservation. The Greens Zoological Rescue and Rehabilitation Centre (GZRRC) has risen to this challenge with its conservation policy. It shall

play a leading role in the global efforts to save endangered fauna from extinction and train future wildlife conservationists. GZRRC Conservation policy is inspired by the Indian National Zoo Policy (1998) drafted by the Central Zoo Authority (CZA), and the International Union for the Conservation of Nature (IUCN) Conservation Planning Specialist Group. The GZRRC Conservation Policy will promote integrated species conservation planning that considers all populations of a species to be valuable, both inside and outside its natural range and under all conditions of management. The GZRRC conservation policy has the goal of creating viable populations of endangered species thriving in healthy ecosystems. This policy aims to conserve endangered species through *ex-situ* coordinated breeding and reintroducing them in wild as and when it is appropriate and desirable. Species conservation requires multi-faceted and collaborative approaches to resolve juxtaposed threats to its long-term survival. GZRRC's combination of living collections, scientific support and wide-ranging skills in interlinking of science and practice can be harnessed to make a substantial contribution to the conservation of several endangered species in the wild. Our conservation policy is based on the "One plan" approach to species conservation that aims to create synergy between the *ex-situ* and *in-situ* conservation of endangered species. In addition to conserving endangered species, GZRRC shall identify critical focus areas vital for securing the long-term future of the species. Some of these actions include garnering community participation in species conservation programmes, increasing awareness for the need of biodiversity conservation among the masses. Our primary goals for the conservation policy are as follows:

1. Indian and global wildlife conservation.
2. Conservation and restoration of natural habitats of species.
3. Conservation education.

In each of our identified areas of policy, we will set tangible goals and regularly monitor our progress in achieving those goals. Biodiversity conservation is a collaborative effort, hence we shall rely on partnerships with a wide range of experts, communities and organizations to achieve our goals of a brighter future. We shall work with many other zoos and conservation centres through the cooperative frameworks provided by organizations like CZA, WAZA, EAZA, etc.

In the near future, GZRRC plans to become a regional leader in conservation breeding of endangered species. Additionally, GZRRC will curate knowledge and experience for the management of endangered captive species that can be used to train personnel for other zoos, inform policymakers and sensitize the populace on various aspects of biodiversity conservation. GZRRC will champion the cause of biodiversity conservation using this multi-tier framework and continue in its efforts of nation building and species conservation to secure a better future for this world and its inhabitants.

## Education Policy of Greens Zoological Rescue and Rehabilitation Centre

### Introduction

Since their conception, zoological parks have symbolized our relationship with the natural world. The earliest records of zoos date back to 5500 years back to the Chinese, Egyptian and the Assyrian empires (Guerrini and Osborne 2018), and since then several cultures have collected exotic animals in a quest to understand the natural world and their role in it. In the latter half of the twentieth century, zoos evolved into conservation institutions aimed at connecting humans with nature. Most master plans and management plans for zoos emphasize education and conservation. Indeed, natural environments are related to long-term well-being (McMahan et al. 2018) as well as a sense of connectedness to nature (Brügger, Kaiser, and Roczen 2011). Zoos serve an important purpose of helping people consolidate their impressions of self, identity with their natural environment (P. W. Schultz and Tabanico 2007). Other social psychologists have also emphasized the importance of “*environmental identity*” in the building of a self-concept construct of a person (Clayton and Opatow 2003).



Figure 3.1: The guiding principles for education programme at GZRRC

In the past few decades, zoos have emerged as important cultural agents, aiding in the dissemination

of knowledge and understanding of the natural world to the polity (Wu, Cheng, and Hong 2017). To counter the threat of global biodiversity loss, modern zoological parks must act as reliable nature interpreters and effective communicators of conservation messages.

According to World Association of Zoos and Aquariums,

“Zoos and aquariums have a duty to lead, support, and collaborate with education programmes that target changes in community behaviour toward better outcomes for conservation.”

Every visit to the zoo is an opportunity for the institution to recruit people to the cause of biodiversity conservation through goal-oriented education programmes. Every year, zoos globally receive more than a billion visitors (Howell, McLeod, and Coleman 2019) which opens up immense opportunities to drive public perception to pro-conservation actions. These pro-conservation actions can range from simple lifestyle changes such as reducing the consumption of single-use plastics to donating to wildlife conservation charities.

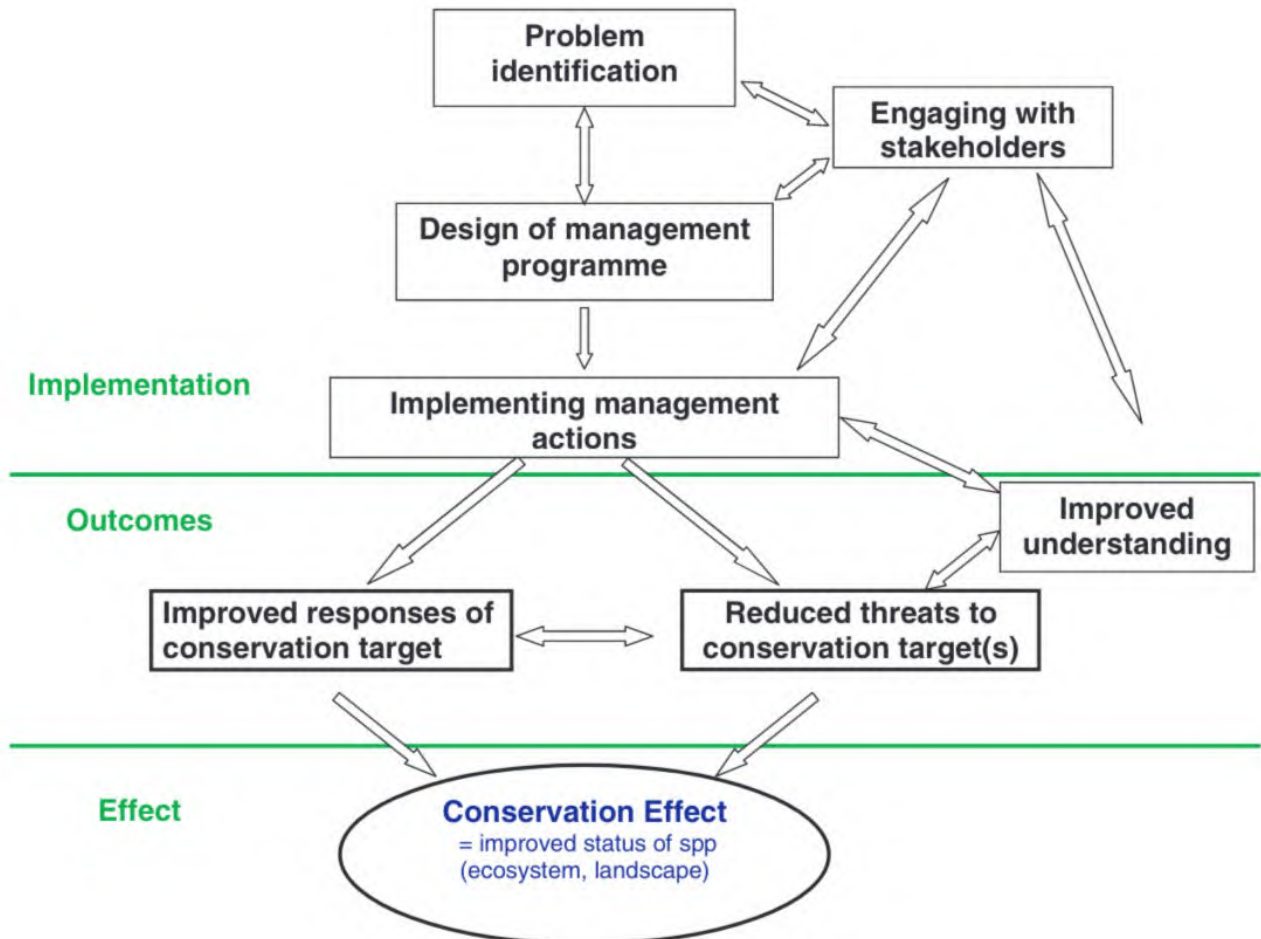


Figure 3.2: Proposed framework for the education programme at GZRRC

### Chapter 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

The World Conservation Strategy emphasizes the importance of educating users of natural resources about sustainable resource use through school curriculum and environmental education programmes. However it is very difficult to understand or measure the real impacts of the education programmes run by most zoological institutions (Kapos et al. 2008). Therefore all zoo-based education programmes should rely heavily on scientific research on social psychology, human learning psychology, neuroscience and biodiversity conservation. Zoo visitor engagement has received a significant amount of attention from social psychology researchers in the past few years. Several studies have been conducted to understand the motivation of zoo visitors. Unfortunately, there is limited information about the efficacy of zoo education programmes at Indian zoological institutions. Greens Zoological Rescue and Rehabilitation Centre (GZRRC) aims to be a scientifically managed modern zoo with a focus on biodiversity conservation and public education. Hence the education policy of the GZRRC has been designed to incorporate findings of research interventions on the drivers of visitor engagement and education at zoological institutions in the past. Recent empirical studies suggest that despite the claims of many zoos, an education program does not necessarily translate to implicit and explicit connections with nature (P. W. Schultz and Tabanico 2007; Bruni and Schultz 2010; Perdue, Stoinski, and Maple 2012). Hence it is crucial to measure, evaluate and redeploy existing education programmes so that they are effective in achieving expected outcomes (Smith and Weinberg 2004; Kapos et al. 2009).

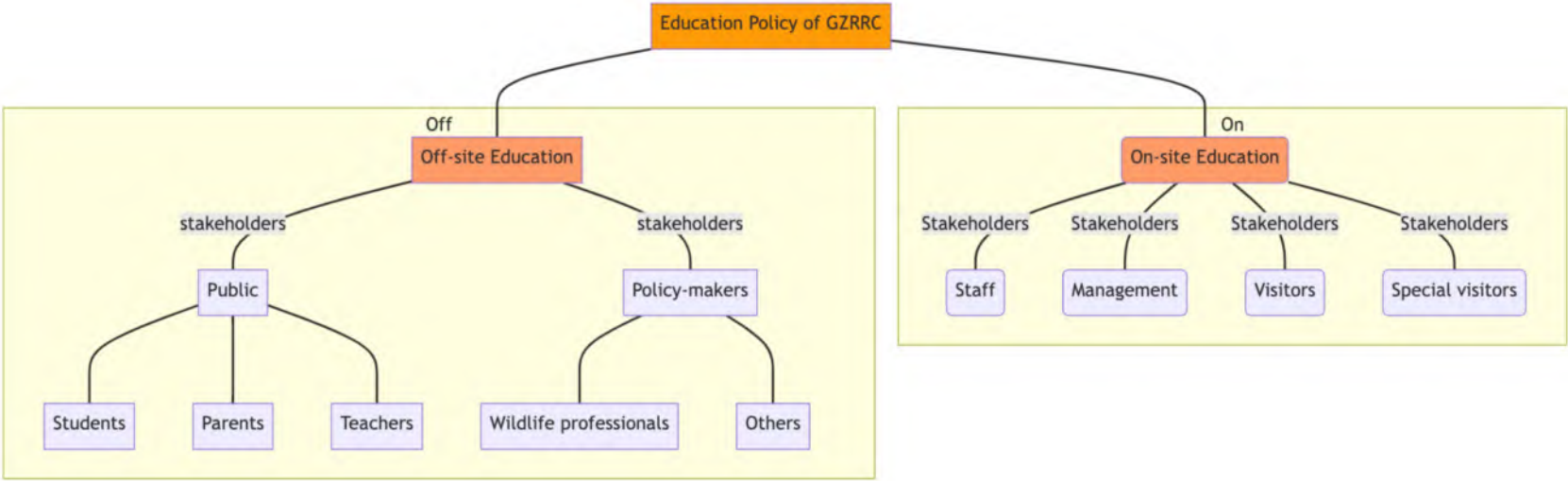


Figure 3.3: Stakeholders for the GZRRC Education Programme

## Visitor Experience Management

GZRRC aims to spread the message of conservation and inculcate a healthy respect for nature in visitors. The zoo will promote the participation of school children in its education programmes. Student participation is crucial to building future stakeholders of the zoo and the society. A well-planned education programme should be tested on a control group representative of the target demographic before deployment and retested periodically to measure its effectiveness. A thorough understanding of the target demography is vital to the success of any education programme. In this regard, GZRRC social psychologists will design visitor evaluation forms to identify the motivation levels of visitors and provide a tailored experience around their specific requirement. According to existing research (Falk 2006; J. G. Schultz and Joordens 2014), visitors to museums and zoos can be categorized into the following groups based on their inherent motivations.

- a. **Explorers** are curiosity driven and seek to learn more about whatever they might encounter at the institution.
- b. **Facilitators** are focused on enabling the experience and learning of others in their accompanying social group.
- c. **Professional/Hobbyists** have intersecting interests in the institutions collections and their passions.
- d. **Experience Seekers** will primarily derive satisfaction from the fact of visiting an important site.
- e. **Spiritual Pilgrims** are primarily seeking a contemplative and or restorative experience.

Based on these motivational categories, GZRRC will tailor its education programmes to cater to each of these visitor motivation scales across all demography levels.

There are two tangible ways to measure the effectiveness of an education program.

- a. The implicit association test measures visitors' connectedness to nature and biodiversity conservation.
- b. Cognitive evaluations based on the progression of visitors through the various phases of the learning outcomes. viz.,
  1. **Cognitive purpose**  
Build knowledge and information frameworks about nature and the role of GZRRC in *ex-situ* and *in-situ* conservation.
  2. **Affective purpose**  
Create positive emotional states, attitudes, values and reinforced cultural constructs for empathy towards nature and species.

**3. Behavioural purpose**

Motivate visitors to incorporate pro-conservation lifestyle changes and become advocates for the conservation of biodiversity.

**4. Inspiration purpose**

Create among the visitors of GZRRC a sense of awe, wonder and enjoyment about the species, and their respective niches.

**5. Skills purpose**

Develop among visitors, an analytical aptitude along with technical skills connected with zoo management and biodiversity conservation.

GZRRC is committed to achieving the goals of biodiversity conservation through the following activities.

- *Ex-situ* conservation of endangered species and eventual reintroduction to reclaimed habitats.
- Conduct research to fill gaps in our understanding of endangered species.
- Conduct education programmes to raise awareness about biodiversity conservation and inculcate a healthy respect for nature among the masses.
- Provide a novel, stimulating and enriching experience for visitors that translates into pro-conservation actions.

As evident from the above-mentioned points, GZRRC aims to integrate its visitor experience programme with its approach to conservation and its public education policies.

This chapter aims to provide an overview of the education policies of the GZRRC with a view to achieve its long-term vision and mission.

GZRRC will then use a standard approach to create the education programme for each target demography.

**Vision of Education Plan**

Through the Greens Zoological Rescue and Rehabilitation Centre, the public will gain an appreciation of nature, resulting in pro-conservation actions.

**Mission of Education Plan**

To educate visitors about the fine balance of nature and biota and the inherent dynamics of complicated ecological processes. In addition, to make them aware of global and local conservation challenges and mitigation measures.

**Aims of Education Plan**

1. To provide an immersive experience to visitors at GZRRC.

### Chapter 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

2. To develop and deliver education material that leads to optimized delivery to the stakeholders.
3. Develop in-house skill for training zoo educators and create facilities for knowledge sharing with other *ex-situ* institutions.
4. Integrate zoo education policy with the research objectives that aids in the conservation of endangered species.

**Objective 1: To provide an immersive experience to visitors at GZRRC**

Table 3.1: Actions and outputs to create an immersive visitor experience integrated with GZRRC Education Policy

Sl No	Sub-objective	Output	Action
1.1	Define the nature of experience for each visitor type.	Each enclosure, area of the zoo will have a conservation message attached to it.	Create a storyline for each area of GZRRC
1.2	Identify key areas for education delivery	Based on the type of education message and the mode of delivery	Key areas of GZRRC will be identified and infrastructure will be developed for the same
1.3	Create a coherent storyline	Engaging storyline developed for each zone	Based on the conservation message topics join enclosure zones or enclosures to create unique visitor experiences for each topic
1.4	Design a visitor experience	Immersive visitor experience created	A complete experience for each education policy storyline will be curated. The level of experience for visitors to be evaluated by independent and in-house experts to optimize efficacy.
1.5	Training of keepers, drivers, docents and educators	Training and upskilling of staff	All visitor-facing staff members will be trained on their unique contribution to the visitor experience

**Objective 2: To develop and deliver education material that leads to optimized delivery to stakeholders**

Table 3.2: Actions and outputs for the design and development of education material for the GZRRC Education Policy

Sl No	Sub-objective	Output	Action
2.1	Identify the target demography	Design tailor-made visitor education experiences	Conduct research and in-depth market analysis to understand the key areas of conservation message that should be delivered to the visitors and students.
2.2	Identify key topics for education message	Create a education plan that meets all education goals	Identify key areas for education message to be delivered to target demography
2.3	Create Education material	Based on the findings of visitor survey create education material that meets the goals and objectives of GZRRC	<ul style="list-style-type: none"> <li>- Delineate education goals for target demography.</li> <li>- Identify key experts to inside and outside organization who will take create and train educators on the education material.</li> <li>- Create the education material that can be delivered through various channels.</li> <li>- Education material should be developed at varying levels of complexity based on the age of the visitor.</li> <li>- Implement education material</li> </ul>
2.4	Evaluate education material	Conduct periodic assessments of the education material to see if it meets the goals of the education policy	<ul style="list-style-type: none"> <li>- Conduct visitor feedback and assessment studies to evaluate the efficacy of the education material.</li> <li>- Based on the finding of the efficacy studies continue or restructure the education plan to reduce redundancies</li> </ul>
2.5	Optimize education material	Optimize the man-power and financial resources for education delivery	- The final step of the process will be to optimize the resource utilization of each education category

**Objective 3: Develop training modules for zoo-educators**

Table 3.3: Actions and outputs for the development of training modules for zoo-educators

Sl No	Sub-objective	Output	Action
3.1	Identify educators for each visitor experience	Each and every participant or every visitor education experience trained	<ul style="list-style-type: none"> <li>- Create a list of zoo education programmes running at each zone of GZRRC.</li> <li>- Identify the key participants in each of the visitor experience programme.</li> <li>- Based on the primary tasks and duties of these stakeholders allocate duties for the execution of the visitor experience management.</li> <li>- Identify key individuals responsible for managing each experience.</li> <li>- Training of the educators</li> </ul>
3.2	Conduct training of educators	All zoo-educators well-versed and acquainted with the education material	<ul style="list-style-type: none"> <li>- Create a schedule for onsite training of educators.</li> <li>- Conduct rigorous initial education training of educators followed by refresher courses for new inductees.</li> <li>- Conduct mock exercises to test the quality of zoo-education being imparted.</li> </ul>
3.3	Create zoo-educator training courses for certification programmes	Become a national institute of excellence for zoo educator training	<ul style="list-style-type: none"> <li>- Identify the list of topics essential for zoo-educator training.</li> <li>- Identify in-house experts and zoo-educators who can impart the training to trainees.</li> <li>- Create a course module for short trainings.</li> <li>- Acquire accreditation from recognized university in the region to become a certified zoo-educator training institution.</li> <li>- Partner with national and international zoo-educator training organizations to impart their content.</li> </ul>

**Objective 4: Develop Research objectives in tune with Education Policy for conservation of species**

Table 3.4: Actions and outputs for the research policy at GZRRC

Sl No	Sub-objective	Output	Action
4.1	Create a research policy for GZRRC	Create a Research output policy integrated with the education plan	<ul style="list-style-type: none"> <li>- Create a list of pertinent conservation focused research topics based on the animal collection plan and the objectives of GZRRC.</li> <li>- Delineate a long-term and short-term research plan</li> </ul>
4.2	Partner with relevant <i>ex-situ</i> institutions	GZRRC will become an institution of global repute for <i>ex-situ</i> research on endangered fauna	<ul style="list-style-type: none"> <li>- Partner with national and international zoological associations to implement a cross-institutional research plan that will involve long-term exchange of research outputs and expertise.</li> </ul>
4.3	Research Policy should translate to conservation actions	Integrate research output with education policy	<ul style="list-style-type: none"> <li>- Research output is published in peer-reviewed national and international journals.</li> <li>- Integrate research output with the ongoing education programmes of GZRRC.</li> <li>- Communicate research outputs with policy makers and pertinent <i>in-situ</i> institutions.</li> <li>- Ensure that the findings of the research outputs are translated into conservation actions.</li> </ul>
4.4	Research output audits	Optimize the implementation of Research Policy	<ul style="list-style-type: none"> <li>- Conduct periodic evaluation of the research policy.</li> <li>- Ensure that Research outputs are integrated with each activity of husbandry and management of endangered animals housed at GZRRC.</li> <li>- Partner with local and international institutions for periodic independent audit of GZRRC Research design and methodologies.</li> </ul>

## Proposed education programmes at Greens Zoological, Rescue and Rehabilitation Centre

GZRRC is duty bound to its vision and mission goals to disseminate conservation themed education to the millions of visitors that will eventually visit the facility. As a modern zoological institution striving to become a leader in terms of zoo-management, visitor experience and conservation breeding, GZRRC will promote learning through living collections. This section provides a brief overview of the educational programmes envisaged under the education policy of GZRRC.

The major themes of the education programme at GZRRC are as follows

- A. Conservation of endangered fauna
- B. Promotion of coexistence with wildlife
- C. Impacts of climate change
- D. Importance of Biodiversity conservation
- E. Promotion of Sustainable behaviour.
- F. Animal Welfare and Conservation.

These five themes will be delivered through the following education programmes at GZRRC.

Table 3.5: Education theme delivery strategies of GZRRC Education Programme

Sl No	Education Programme	Target demography	Duration	Education materials required
1	Nature Education Camp	School students	4-5 days	<ul style="list-style-type: none"> <li>- Self learning kits for teachers and educators.</li> <li>- Brochures with education-material.</li> <li>- Stationery Kits.</li> <li>- Zoo maps.</li> <li>- Biodiversity map of the zoo and adjoining areas.</li> <li>- Time-table for all activities.</li> <li>- Feedback forms.</li> <li>- Audio-visual content for the programme.</li> </ul>
2	Weekly education programme	School students and children of various ages	2-3 hours	<ul style="list-style-type: none"> <li>- Self-learning kits.</li> <li>- Drawing books.</li> <li>- Animal quiz.</li> <li>- Stationery Kits.</li> <li>- Audio-visual content for the programme</li> </ul>

## Social media education and outreach programme

The GZRRC zoo is committed to fostering a love for wildlife and inspiring conservation action through engaging social media education programs. GZRRC aims to engage with a global audience and promote animal welfare, environmental responsibility, and the importance of global biodiversity conservation across major social media platforms. We will maintain a presence on various social media platforms, including Facebook, Instagram and YouTube. Content for each platform will be tailored to its unique audience and content format.

### Content Strategy

- a. Educational Content: We will share informative and engaging content about the animals in our care, their natural habitats, and conservation efforts. This may include:
  - Educational videos showcasing animal behaviours and adaptations.
  - Informative posts about conservation issues and how visitors can get involved.
  - Behind-the-scenes glimpses into animal care and enrichment programs.
  - Interactive Content: We will encourage audience participation through polls, quizzes, and interactive features to make learning fun and engaging.
  - Live Events: We may host live Q&A sessions with animal care staff or veterinarians to provide real-time interaction and address audience questions.
  - Visitor Engagement: We will encourage visitors to share their experiences at the GZRRC zoo using designated hashtags and by tagging the zoo's social media handles. ##### Target Audience Our social media content will cater to a broad audience, including:
    - Families with young children
    - Students and educators
    - Animal enthusiasts
    - Conservation supporters
    - The local community
  - Community Engagement
  - GZRRC will actively participate in relevant online conversations and discussions about wildlife conservation and animal welfare.
  - GZRRC will collaborate with other zoos, conservation organizations, and influencers to reach a wider audience and amplify our message.
  - GZRRC will encourage responsible online behaviour and promote respectful discourse in our social media comments sections.

**Metrics and Evaluation** GZRRC will monitor key metrics such as reach, engagement, and follower growth to measure the effectiveness of our social media strategy. GZRRC will regularly evaluate and adapt our content based on audience response and evolving social media trends.

### **Education Strategies**

GZRRC aims to use its education policies to raise conservation awareness in the mind of all visitors that translates into pro-conservation actions. The effectiveness of zoo-education programmes is based on the incorporation of these pro-conservation actions in the lifestyle of the recipient. Hence the GZRRC education policy should be implemented through different channels of communication viz., audio-visual and kinaesthetic.

### **Key messages that can be delivered through the education policy**

The Greens Zoological, Rescue and Rehabilitation Centre is going to be a pioneering institute leading the awareness movement for biodiversity conservation. The education and outreach policy of GZRRC has been designed to accommodate that vision. The following key messages have been identified as the key to the realization of the long-term education goals of GZRRC.

**Challenges for Global Conservation** Since GZRRC is home to several endangered endemic and exotic species of wild animals it is important for visitors to understand the unique conservation perspectives threatening global conservation. Therefore the education programme at GZRRC will focus on species-wise and biogeographic zone-wise education material. All education material will integrate with coherent audio-visual guides that will aid in the learning through different communication channels. The visitors will be given a bottom-up education experience on global and local conservation challenges that will break dogmas and given them an unique perspective. The aim of this topic is to provide visitors with a fundamental concept of global conservation challenges. A list of pro-conservation actions depending on the demographic profile of the visitors will be shared during the education programme. These pro-conservation actions will include simple lifestyle changes such as reduction in the usage of single-use plastics, reduction of carbon footprint and other steps will be included.

**Challenges to Human-wildlife coexistence** In the twenty-first century as the anthropogenic pressures on wildlife habitats increase, there has been a surge in human-wildlife interactions. Urban centers are witnessing a high number of wild pests, while the conflict of wildlife with rural areas has also increased exponentially. Since the fate of global conservation is primarily determined by the attitude of the polity towards wildlife and nature, there is an urgent need to control the narrative around human-wildlife coexistence. GZRRC will aim to promote the cultural precedents of human-wildlife coexistence amongst the visitors by narrating engaging case-studies. In this topic, visitors will learn how to behave during a wildlife encounter. As a part of this topic, visitors will be provided information of common dos and dont's of wildlife interactions through enactments and audio-visual tools. Every year, several thousand of people and animals lose their life to wildlife conflict, however this can be mitigated by raising awareness and promoting the tenets of co-existence that is the cornerstone of the Indian ethos.

**Rescue and Rehabilitation Programmes** Indian culture promotes co-existence with nature which drives the ethos for animal welfare and conservation in the twenty-first century. However, when wildlife and humans interface in a rapidly proliferating economy like India, conflicts might occur. Under such circumstances, wildlife rescue and rehabilitation programmes become necessary for the preservation of life and to maintain the cultural support for conservation in the public ethos. Wildlife may need to be rescued for multifarious reasons apart from conflict such as severe inter-specific competition, and natural calamities among others. GZRRC is committed to preserving life and providing required support to wildlife rescue and rehabilitation operations. GZRRC has partnered with the forest departments of several states to ensure a safe rescue environment and to provide long-term care for the rescued animals. The education programme at GZRRC will focus on highlighting important case-studies that will create an enriching education experience for visitors.

**Conservation Breeding programmes** Conservation breeding programmes of critically endangered species like Pygmy hog, mouse deer, and other exotic species like przewalskis horses (Mallinson 1995; Der Sarkissian et al. 2015) have been possible due to advances in *ex-situ* conservation approaches in the twenty-first century. The education programme for this topic shall focus on the evidences of the sixth mass extinction and a timeline of the other mass extinction events that has happened in the history of the earth. In the past half-century, under the growing pressures of rapid biodiversity loss, *ex-situ* institutions have commenced the conservation breeding programmes for several species. Some conservation breeding programmes have also achieved reintroduction success, which has led to the repartiation of critically endangered species to reclaimed habitats. The education policy of GZRRC will focus on some case studies for conservation breeding programmes for endangered wild- fauna around the world. The primary education message for this topic will be to provide the visitors a clear understanding of why conservation breeding programmes are essential for the survival of species in the wild. The topic will also educate the visitor about the integration of *in-situ* and *ex-situ* techniques for the achievement of common goal i.e. biodiversity conservation. The visitors should leave the education programme, knowing that modern zoos like GZRRC are actively involved in the conservation of endangered species in the wild.

**Role of Zoos in *ex-situ* conservation** Modern zoos play a crucial role in the conservation of several endangered species. In the past five decades, zoos have progressed immensely in terms of developing expertise in *ex-situ* conservation of endangered species.

**Importance of animal welfare in conservation** GZRRC plans to create an immersive visitor experience that also emphasizes the importance of animal welfare in conservation. By highlighting the animal welfare practices of GZRRC, we will garner positive attitude among the visitors towards the importance of zoos and aquarias in conserving wildlife. Students and selected visitors will be taken behind the scenes of the zoo operations to show the life of several endangered species and how they interact with their respective keepers. The visitors will be sensitized to the importance ensuring animal welfare in enclosure design, daily husbandry and enrichment strategies. The keepers at GZRRC will demonstrate how the welfare of each species under their care is taken under consideration during each

step of their daily husbandry regimen. Zoo-biologists and docents can explain to visitors how the welfare of animals is considered while designing enclosures. The docents can also explain to visitors why animal welfare is a determining factor in the success of *ex-situ* conservation programmes.

**Conservation and sustainability education** GZRRC prioritizes sustainability and will integrate these concepts into the conservation education programme. The aim of this conservation education goal will be to mobilize the zoo visitor as ambassadors for conservation. Through this education programme, children and visitors will be sensitized to the urgent need for pro-conservation actions in daily lifestyle. Children will be informed about the crucial role they can play in preserving the biodiversity of the planet by reducing their family's carbon footprint. Based on the age of the visitor, they will be exposed to different levels of a complicated conservation challenge like the following.

- **Biodiversity loss** - topics like mass extinctions, population collapse, hunting and poaching, loss of pollinators.
- **Climate emergency** - Ways of changing climate impacts, Science of global warming.
- **Use and overuse of natural resources** - Overfishing, mass meat production and the effects on climate and biodiversity.
- **Marine and freshwater conservation** - Importance marine protected areas, impacts of ocean acidification.
- **Pollution**- Effects of microplastics on marine biodiversity.
- **Deforestation** Loss of habitats, monoculture and the effects of palm oil on species and ecosystems.
- **Human health and rights**- Family planning, voluntary population control, zoonotic diseases, human rights.
- **Human interactions with wildlife and the environment**- Human-wildlife conflict, responsible ecotourism, exploitation of wild animals by people.
- **Sustainable solutions**- alternative energy sources, reducing meat and dairy consumption. sustainable fishing, changing commuting habits, ecosystem services.

**Way Forward** The GZRRC Education strategy is designed to include some of the pertinent strategies that will shape the pro-conservation culture of this nation. Since GZRRC is a new organization, there are limitless opportunities for its education programme to proliferate and branch into several aspects of bringing pro-conservation lifestyle changes. The GZRRC conservation education strategies will be implemented as soon as the facility is opened to the public. Based on the data collected from the visitor-feedback and the audit of the incumbent education programmes, GZRRC will course-correct and keep creating new education programmes and re-purposing old modules so that the vision

and mission of the education policy is carried forward. Ultimately GZRRC will become a key institution for maintenance and transference of knowledge for conservation education and natural history that will assist in public education, help in policy-decisions, and sensitize the public.

### **GZRRC Sustainable Management Policy**

#### **Introduction**

Contemporary zoos serve as centers for global biodiversity conservation that should provide solutions to twenty-first century problems. Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) is committed to fostering a healthy reverence for nature among all visitors, as outlined in its vision statement. In order to achieve the goal, GZRRC will become a living example of sustainable and eco-integrated design principles that can guide modern zoo design and inspire the populace to make pro-conservation lifestyle changes. As per the twenty-first century conservation goals, all conservation-facing organizations should have a “green policy” that has the long-term objective of a net-zero carbon footprint. GZRRC on the other hand, plans to implement a carbon sequestration road map that will align with its goals for pro-climate actions. GZRRC’s green policy initiative emphasizes energy and water conservation, biodiversity preservation, and the promotion of traditional knowledge to instil a sense of reverence for a sustainable lifestyle among tourists. There is an urgent need for zoos and aquariums to adopt a sustainable model for development. This will foster greater care for nature and wildlife among the billions of visitors who come to zoos annually (Townsend 2009). Furthermore, it is important for zoos to have a consistent message that resonates throughout all operations and departments. A sustainable development model is crucial to the success of any organization, but especially for a modern zoological institution. The GZRRC aims to incorporate the tenets of sustainable zoo development into every aspect of its daily operations and management.

Sustainability can be defined as.

*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

GZRRC’s animal welfare standards for zoo animals also reflect its decision to source livestock from suppliers who provide adequate welfare at their respective farms. GZRRC continuously strives towards sourcing most of its daily feed requirements from suppliers who follow sustainable organic farming and livestock holding policies. As suggested by several experts, GZRRC is on its way to becoming self-sufficient in organic browse production. According to EAZA guidelines, a zoo should work towards sustainability to provide a positive example to visitors and other stakeholders (Snijder 2013). According to the 2007 Conservation Breeding Specialist Group Meeting (Budapest, Hungary) and the annual conference of the World Association of Zoos and Aquariums (Budapest, Hungary), sustainable zoos should.

1. Balance economic, social and environmental sustainability factors.

### Chapter 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

2. Establish clearly-defined policies on sustainability in order to ensure organization wide adoption of the goals.
3. Adopt a established approach to measuring ecological footprint and strive towards minimizing the same.
4. Develop clearly defined roles for each department to reduce wastage, and increase sustainability.
5. Display consistency in sustainability goals across all forms of zoo management.
6. Work in partnership with other zoos to make collective progress towards a more sustainable world.
7. Engage local communities as participating stakeholders in the sustainability programme of the zoo.

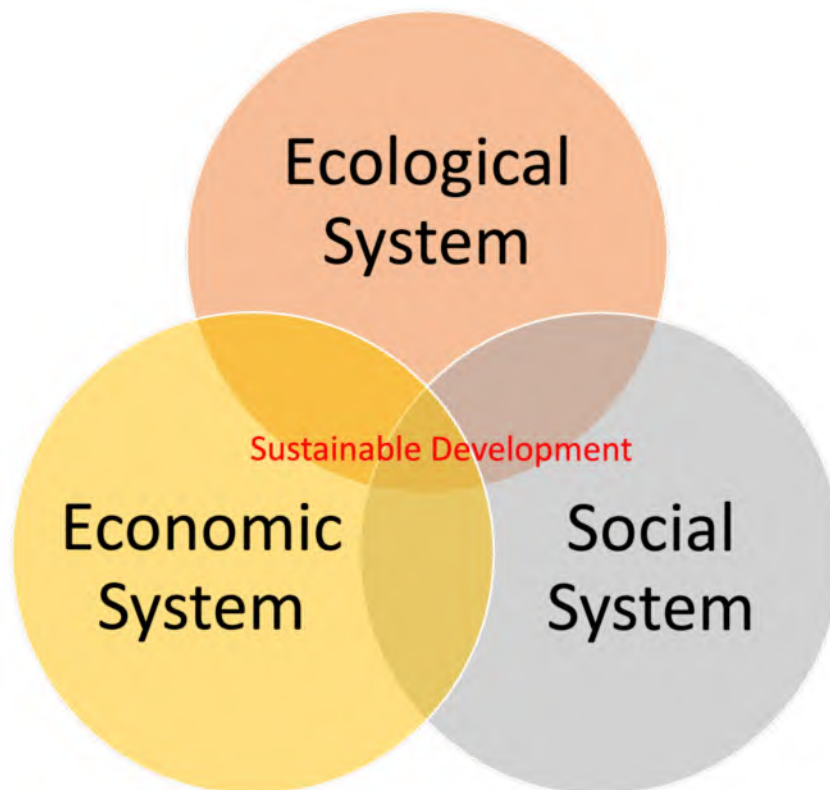


Figure 3.4: Model for sustainable zoo development (Townsend, 2009)

According to Townsend (2009) zoos and aquaria can become sustainable using the “Triple Bottom Line” framework that constitutes of the following tenets for

GZRRC shall strive to base its future growth on an economically stable model that enables sustainable policy development. These policies will be complemented by economically viable fiscal policies.

- Social Contribution - GZRRC will work towards the social and economic upliftment of society by eradicating poverty and providing livelihoods that fulfill people's cultural, spiritual and material needs.
- Ecological Integrity - GZRRC strives to save life-giving ecosystems for the restoration of biodiversity and maintain its long-term viability

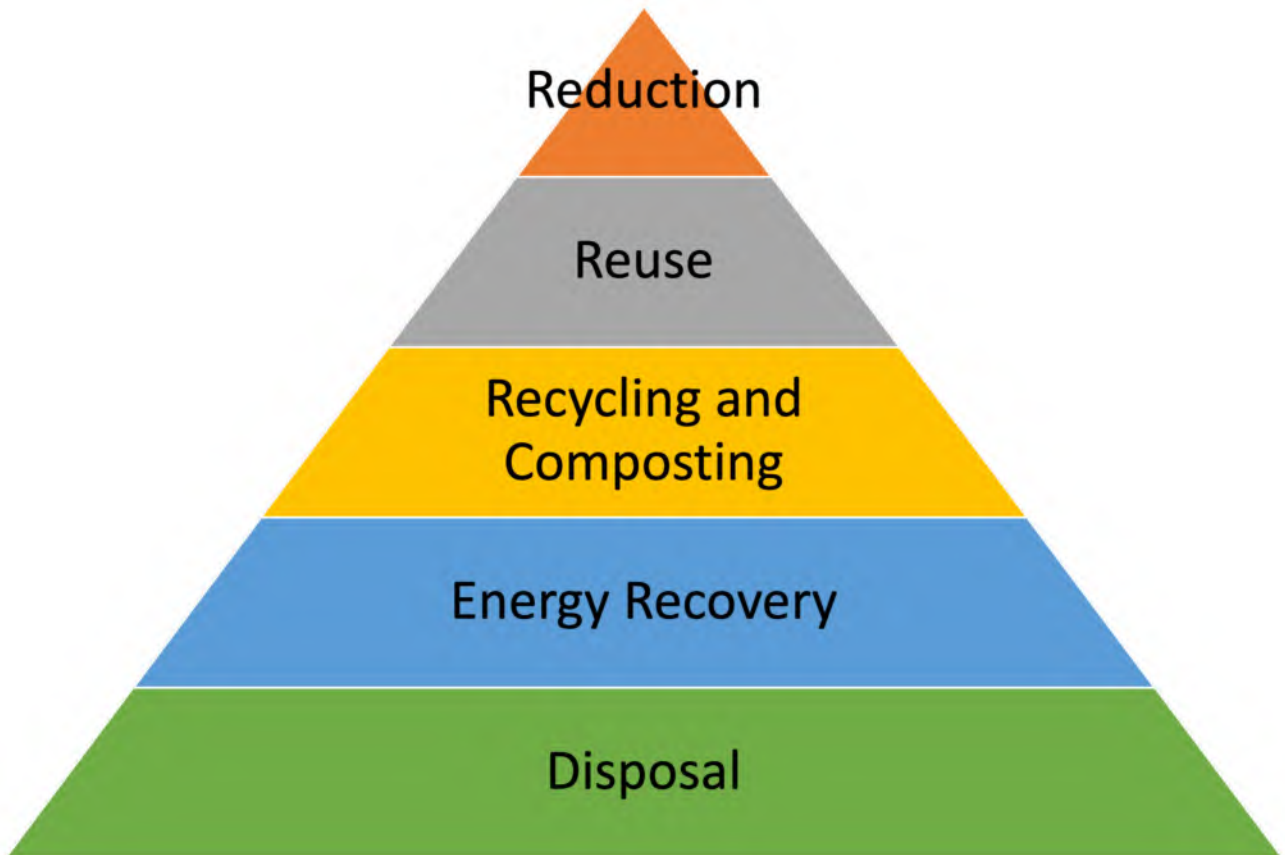


Figure 3.5: Resource management policy of GZRRC (Townsend, 2009)

**Renewable energy sources** As per the present design and the proposed framework, over the course of the next twenty years, GZRRC will have a net negative carbon footprint by using alternative energy sources complemented by carbon sequestration. More than 40% of the area of GZRRC is covered with vegetation, with a proportional green belt that reduces the carbon footprint of the organization. GZRRC will ensure that it provides a safe and healthy environment for all stakeholders viz., animals, visitors and staff.

**Water conservation strategy** GZRRC is situated in a water-rich region of Gujarat and due to its close proximity to several small water reservoirs, it receives a substantial amount of groundwater and surface water throughout the year. However, in cognizance of the prevalent drought in several

other parts of the country and to ensure a sustainable model of zoo management, GZRRC has taken up sustainable water management policies across all its facilities. These are some of the interventions GZRRC has undertaken to ensure complete water conservation.

- GZRRC implements a comprehensive rainwater harvesting policy so that the high amount of rainfall received in this region is stored and can be used to maintain the landscape of the facility for the rest of the year.
- The area around GZRRC receives more than 80% of its annual rainfall during the months of July and August (157mm-190mm). Therefore, it is crucial to have a sustainable management plan for the rest of the year that will ensure year-round water supply to all parts of the facility.
- GZRRC has a well defined waste water management policy that reduces unnecessary water consumption, filters waste water organically and reuses it in various aspects of daily operations.

**Animal feed from organic farms** GZRRC has an offsite organic farm that uses sustainable methods to produce fruits and vegetables without the use of artificial fertilizers and pesticides. In the modern age, with farmers becoming over-dependent on inorganic fertilizers and genetically modified seeds, this green farm is an excellent example of how sustainable farming can be used efficiently for zoo management. As per its long-term sustainability goals, GZRRC is committed to adopting sustainable fodder acquisition policies. GZRRC has an organic farm that supplies fodder for all the herbivore enclosures in its facilities. The organic farm uses bio-waste from the herbivore enclosures for composting and organic fertilizer. GZRRC believes in standing by sustainable goals for conservation-oriented zoo management.

**Waste management policies** As a zoological park, GZRRC staff clean a large amount of faecal matter from the enclosures every day. At present, GZRRC houses several species of large and medium herbivores that produce a significant amount of faecal matter daily. GZRRC has implemented a policy that uses the bio-waste generated in its facilities as manure for the organic farm that is used to produce feed for its animals. The GZRRC education strategy is integrated with its green policies so that visitors may get a hands-on experience of how faecal matter is utilized across the facilities.

### **A sustainable zoo management model**

**Eco-friendly zoo design** Construction activities are one of the biggest contributors to air pollution. GZRRC strives to reduce the carbon footprint of all infrastructure development activities by ensuring that all contractors follow stringent steps towards curbing fine-dust pollution and also deploy resources for carbon sequestration. GZRRC employs locals as a part of its community building programme across various domains of its daily operations. GZRRC also invests in the upskilling of local communities so that they become eligible for recruitment as zoo-keepers and assistants. The GZRRC local outreach program aims to reach out to all levels of society and recruit masses to become conservation ambassadors.

**Record-keeping** A modern zoo needs to be data-centric in order to make appropriate decisions to preserve the biodiversity under its care. Regular record-keeping is vital to the smooth running of all modern zoos. GZRRC is highly focused on maintaining all records pertaining to animal management and daily activities occurring at the facility. All keepers, biologists, veterinarians, senior management, curators and the director are trained on TRACKS zoo management software. Keepers, who are the frontline workers and directly interact with all animals at GZRRC are equipped with workstations as well as tablets for constant access to the TRACKS software. GZRRC has implemented a reliable database management system that integrates all aspects of its zoo management programme to management decision making using a layered approach.

### **Ecological integrity**

**Free-ranging wildlife management** As per the results of a local biodiversity study, the site of GZRRC is home to a wide variety of endemic flora and fauna. During the months of October-January, the facility also welcomes a large number of migratory birds. GZRRC's main objective is to protect and promote local biodiversity through habitat protection, management, and proliferation. As a part of its education strategy GZRRC educators will also sensitize visitors to the unique facets of the biodiversity of the region and the challenges for their conservation. GZRRC will fund research projects in collaboration with local and international wildlife research institutes to further the understanding of the ecological parameters of native species in the region.

**Frozen Ark concept** In the twenty-first century, the world is witnessing a loss of biodiversity at an unprecedented scale and speed (Clarke 2009; Breithoff and Harrison 2020). This has led to an urgent requirement for preserving the existing biodiversity of the world using various methods. Gene bank conservation is a prevalent form of biodiversity preservation that has been utilized by various zoos and *ex-situ* conservation institutions. Verma, Lee, and Salamone (2022) and other experts have suggested the usage of induced pluripotent stem cell (iPSC) technology to reprogram somatic cells into pluripotent stem cells for the recovery of endangered species. The GZRRC plans to form a partnership with an Indian cryobank organization, such as the Laboratory for Conservation of Endangered Species, to create a local and remote repository of gene banks for all species included in its collection plan. The frozen bank will be the first of its kind in the country and it will lead the charge in collecting and storing the genes of several other endangered species housed at Indian zoos for insuring their long-term survival. The frozen bank will give priority to critically endangered species such as Asiatic lions, Great Indian Bustards and snow leopards.

**One-plan concept** In the twenty-first century, it is vital for all conservation-focused organizations to join forces to identify challenges and overcome them together. A one-plan concept of conservation management aims to preserve species by combining *in-situ* and *ex-situ* institutions in synergistic ways. GZRRC as a zoological park, rescue center, and research organization is aiming to become a leader in species-conservation programmes for their long-term survival. GZRRC will not only focus on creating stable populations, but also behaviourally capable and genetically diverse populations of

endangered species. GZRRC will also focus on preserving existing habitats and reclaiming lost ranges for certain critically endangered species to give them a second chance at repatriation. GZRRC will collaborate with national and international partner organizations. For the greater good of all species included in its collection plan, it will use expertise in animal management, handling, population management, and ecological restoration.

**Focus on Animal Welfare** It is well known that animal welfare is critical for the biopsychosocial well-being of captive animals (Boissy et al. 2007). According to several experts in the field, animal welfare is also crucial to the maintenance of vital species-typical behaviours in captive populations that can translate into post-release fitness (Bennett and Routh 2000; Swaisgood 2010). GZRRC is committed to providing a species-specific and individually-tailored husbandry and management experience to all animals in its collection plan. In the GZRRC animal welfare programme, keepers, biologists, veterinarians, and curators receive training on animal welfare best practices based on the species' biological requirements. All husbandry and management practices of GZRRC including animal-handling, training, and treatment protocols are vetted by animal welfare experts, who consider the species-specific and individual welfare requirements for each species. The keepers and veterinarians work together on developing behavioural training programmes for every individual to ensure their cognitive welfare is catered to.

**Way forward** GZRRC is continuously striving towards creating a better world through its sustainable policies that are aimed at biodiversity conservation and the sensitization of the populace. The GZRRC is cognizant of its responsibility to the nation, its people and wildlife and is committed to creating a sustainable future that fosters a healthy attitude towards sustainability and biodiversity conservation.

#### **Approach to animal health management, record keeping system for health, diet, welfare and husbandry management for Individual animals**

Modern zoological parks need an appropriate animal health management system for the long-term care of its animals. GZRRC has a multi-faceted approach to animal health management and welfare to ensure that all animals receive optimal nutrition, cognitive stimulation, and have adequate access to diagnostic, prophylactic and therapeutic treatment. In addition to the health policy, the behavioural management programme of GZRRC considers the species-typical behavioural requirement of each species and provisions adequate enrichment and management programme to cater for the same. In addition, keepers and veterinarians also create tailored enrichment and husbandry manuals for every individual within the parameters of the species- management policy. GZRRC has a comprehensive medical policy that relies on modern data science approaches to collect, analyse, and understand data for advanced medical intervention and disease treatment. The GZRRC health management policy is dedicated to ensuring a safe environment for all stakeholders of the zoo i.e., zoo animals, staff, and visitors by creating and implementing SOP for zoonotic disease management and biosecurity. The

### Chapter 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

GZRRC is presently constructing one of the finest animal hospitals in the country that will be able to provide prophylactic and therapeutic interventions to different species of animals

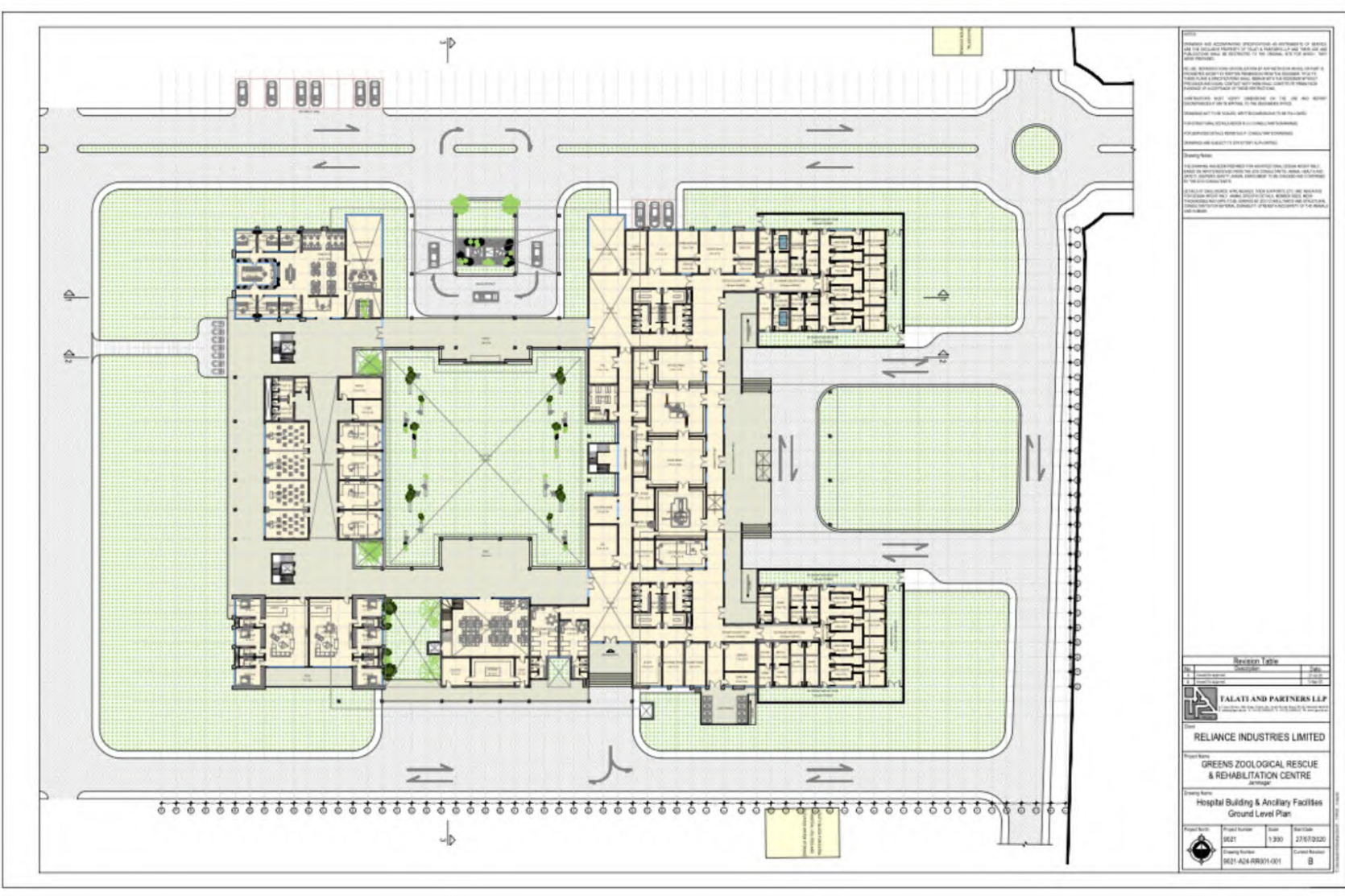


Figure 3.6: Proposed Animal Hospital Facility at GZRRC

**Positive reinforcement based conditioning for medical intervention.** GZRRC has an active behavioural training programme that is used by keepers to train animals on simple behavioural tasks that aid in husbandry and management. The keeper and veterinarians use positive reinforcement training tools to create a safe environment for the keepers and animals. Rather than using stress-inducing restraining techniques, keepers are trained to use humane behavioural training process so that all veterinary interventions can be safe for animals, keepers, and veterinarians. Animals have been trained to cooperate with keepers during transfer between enclosures, diagnostic sample collection, prophylactic treatment like footcare for certain animals, vaccination, physiological examination, and other daily husbandry procedures.

**Restraint of zoo animals** As a part of daily husbandry practices, restraints are required for treatment and transport of animals of animals. Restraint techniques can be physical, chemical, or based on training. While physical and chemical restraint policies come with their own caveats, the training-based restraint approach is humane and accounts for the welfare of animals and keepers. For animals that are cooperative and have history of obedience and stable temperament, keepers and veterinarians conduct regular vocal and target-oriented training based on positive reinforcement learning. In case, behavioural training is not a viable option, physical restraining methods will be employed in a humane manner. Animals at GZRRC are trained to enter, or be enticed, rather than forced, into the specially designed restraint device. Care is be taken so that the time for physical restraint using squeeze cages and will be minimized. Chemical restraints are employed only if the veterinary interventions are invasive and require animals to be motionless for prolonged periods. GZRRC has a detailed SOP for anaesthetizing protocols for different species.

Restraining of zoo animals is performed only for animals that need intervention at GZRRC. Before restraining, animal's history and temperament, animal care staff experience, and equipment available are taken into consideration. Physical restraint will be performed with minimal risk with adequate restraint devices, such as squeeze cages or chute systems. Many procedures are performed on un-anaesthetised animals under physical restraint, including limited physical examinations, administration of injections (including anaesthetic drugs), collection of blood samples, or minor hoof trims. Animals at GZRRC are trained to enter, or be enticed, rather than forced, into the specially designed restraint device.

**Diagnostic Techniques for Zoo Animals at GZRRC:** Diagnostic techniques are crucial to the health management policy of GZRRC. Animal keepers at GZRRC are trained by senior veterinarians on basic diagnostic techniques for each species using visual and behavioural examination. As soon as keepers alert veterinarians about emerging health concerns for an individual animal or a group of animals, the veterinary team. The initial diagnosis is then corroborated by other lab-based approaches like profiling for CBC, biochemical profile, serology and cytology, faecal examination for endo-parasites, urine for urinalysis and through microbial culture. Radiography and ultrasonography are done using X-Ray machines and Ultrasound medical equipment for non-invasive diagnostics.

**Drug administration for animals:** Drug administration is required for treatment and preventative medication of animals. There are various methods for drug administration, which includes oral, rectal, subcutaneous, and topical methods. Drug administration for animals at GZRRC is done based on medical prescription by the respective veterinarians. Oral medication is widely used for administration of drugs at GZRRC even though may be challenging with intelligent species and can be difficult to administer when animals are housed in a group. This is done by positive reinforcement training there by many animals voluntarily allow zoo personnel to administer medications both orally and intramuscular injections. Remote delivery of drugs through subcutaneous and intramuscular darts is performed when drugs cannot be administered through other methods. The delivery system of the drug is decided based on the species, the condition of the animal, details of the treatment, husbandry conditions and the long-term welfare of the individual.

**Anaesthesia Considerations for Animals at GZRRC:** Administration of anaesthesia to zoo animals is done when animals need to be subjected to a lengthy and otherwise painful medical procedure i.e., when there is a need for surgical intervention or medication that cannot be done otherwise or for transport of animals. Procedures including anaesthesia are performed by trained veterinarians. All anaesthetic drugs are highly controlled and regulated by the government due to their strong narcogenic properties and henceforth proper records are maintained for their usage. An anaesthetic plan is developed for each anaesthetic episode which include the anaesthetic drugs and doses to be used, pharmaceuticals, monitoring equipment, and other special equipment to perform the procedure. Anaesthetic monitoring is done by monitoring heart and respiratory rate and temperature. Oxygenation, ventilation, and blood pressure during anaesthesia. Attention is paid for appropriate positioning and padding of anesthetized animals and extremes of environmental conditions to prevent secondary complications. GZRRC veterinary team has a detailed SOP for all anaesthesia interventions. Parasite Control of Zoo Animals:

Comprehensive parasite control is an integral part of GZRRC preventive medicine program. Zoo animals are vulnerable to endo- and ectoparasites, and parasite management at GZRRC includes veterinary and husbandry interventions. Veterinary intervention includes frequent deworming of animals periodically while husbandry practices include prophylactic measures to control parasites. Additionally, regular vaccinations are conducted to ensure that animals and keepers are protected from zoonotic diseases. GZRRC implements a stringent biosecurity protocol that supplements its disease screening and prevention policy. All sites within the facility must follow the overarching GZRRC biosecurity SOP in addition to site-specific and enclosure specific SOPs to prevent the spread of parasites.

**Post-mortem examination:** Post-mortem examination is an essential part of health monitoring of animals at GZRRC. Post-mortem examination as part of a thorough pathologic examination, including medical, husbandry, and nutritional history of the animal, is valuable in identifying problems requiring immediate action to safeguard the health of the animal and trends over time. Complete examination of all dead animals at GZRRC is carried out. Examination of dead animals serve to monitor for infectious and other disease trends. Complete post-mortem examinations include gross evaluation of the carcass with histopathologic evaluation of tissue.

**Vaccination and deworming:** Vaccination and deworming are vital prophylactic interventions required to prevent the proliferation of disease among captive animal populations. GZRRC has adopted a detailed vaccination programme on notified diseases depending on species to prevent infectious diseases. Vaccination for diseases is done by taking into considerations for geographic area and disease risk. GZRRC veterinarians routinely collect, blood, hormone and urine samples to screen captive populations of known virological, bacterial threats. Welfare management System

Apart from ensuring good health, it is essential for animals to be in a good state of welfare that allows them the opportunity experience positive affective states. There has been a lot of research on the effects of pro-welfare enclosure husbandry practices on the behavioural and physiological welfare markers of prominent species housed at zoos. Most studies report that species-specific welfare is responsible for the retention of behavioural diversity in captive populations which in turn is crucial to the post-release survival of reintroduced animals. Presently, there is limited information on the parameters of welfare of several species of invertebrates, fish, amphibians, reptiles, and birds housed at zoos and conservation breeding centres. Welfare assessment protocols have been developed to understand the effects of enrichment intervention on the welfare of animals housed at GZRRC.

GZRRC is driven by a pro-animal welfare policy that is second only to its safety protocols. The GZRRC enclosure design and husbandry practices are designed to ensure that all animals have access to outdoor areas for more than 18 hours in a day. Captive animals are provided access to enrichment devices that stimulate their cognitive capacities and encourage them to display species-typical behaviour patterns along with enough chances to have positive social interactions with conspecifics. At GZRRC, enclosures are designed to be species-specific, but husbandry regimens are tailored to meet individual, behavioural requirement to optimize welfare.

**Record keeping system** Accurate animal records are to be kept for institutional as well as legal requirements. The information records are a vital aspect to good animal husbandry. Records allow quick and easy access to information. At Greens Zoological Rescue and Rehabilitation Centre (GZRRC), all records pertaining to health, diet, welfare and husbandry of every animals at the facility are maintained both in digital and print format. Records play a major role in breeding management, genetic diversity tracking, health and welfare monitoring as well as daily management of animals at GZRRC. GZRRC follows the guidelines mandated by the Central Zoo Authority of India (Recognition of Zoo Rules, 2009 with (Amendment) Rules, 2013) and maintains all records as mandated. Additionally, all records pertaining to each animal are digitally recorded in a collection management software “TRACKS”. The software enables staff to track and manage animal records including animal health, husbandry, inventory, training, laboratory data, record animal behaviour observations, evaluate enrichment or training sessions, from a single, centralized platform.

**National One Health Mission** Greens Zoological, Rescue and Rehabilitation Centre’s goals are in alignment with the National One Health Mission that posits the importance of having multi-institutional and multi-disciplinary approach to tackling the emerging challenges to the health of humans, livestock and wild animals. GZRRC will work closely with national-level institutions that will assist the overall pandemic preparedness and integrated disease control capabilities of the nation.

### Chapter 3 Future Objectives of Greens Zoological Rescue and Rehabilitation Centre

The one health concept is comprehensive and encompasses overall health of all humans, livestock and wildlife inhabiting the environment. GZRRC will integrate with the national surveillance programme for comprehensive mapping of all ongoing disease surveillance programs. GZRRC will lend its expertise and infrastructure in support of the one health mission. The GZRRC will support existing laboratories and develop its own infrastructure to enhance the national laboratory capabilities for disease mapping.

#### **Way forward**

Greens Zoological Rescue and Rehabilitation Centre will continue to provide the best possible for all animals under its care. The GZRRC facilities, infrastructure and staff will not only cater to the health and welfare needs of the animals under its care, but also provide world-class care to any animal in need of urgent medical care. The GZRRC health management plan extends beyond its borders and caters to the needs of *in-situ* wildlife health management by partnering with state forest departments. In the future, GZRRC will partner with sister organizations, as well as veterinary colleges in India and abroad to create capacity for advanced treatment of captive wild animals.

## 4 Future Action Plan

Greens Zoological, Rescue and Rehabilitation Centre (GZRRC), will strive to fulfil the mandates of the approved Collection plan for the facility. The Collection Plan for GZRRC has been designed to include endangered species that require critical support through *ex-situ* conservation for their long-term survival. GZRRC will form partnerships with national and international zoological institutions and associations to maintain a demographically stable captive population of the species. GZRRC is committed to the “One-Plan” Approach for species conservation that links *ex-situ* with *in-situ* approaches for the holistic conservation of species, habitats and coexistence with communities. In this regard, GZRRC will continue work towards the *in-situ* conservation of the species to prepare for their repatriation to reclaimed habitats. GZRRC professionals will also conduct community outreach programmes to garner the culture for existence with wildlife and mitigate the risk of human-wildlife conflict.

### Animal Collection Plan of GZRRC

Collection planning is a vital component of zoo design (Brereton and Brereton 2020). Zoos are often tempted to select large, charismatic animal species to maintain visitor interest and create an impressive portfolio of animals for their inventory. However, each species included in the collection of a zoo should serve a educational and conservation role in the master plan of the zoo. GZRRC is cognizant of the biodiversity conservation challenges plaguing the world in the twenty first century. GZRRC aims to become one of the key contributors to the global biodiversity conservation initiative by creating a safe haven for species across several taxa.

Zoos have been often blamed for focusing conservation efforts on charismatic species that draw the attention of visitors (Brereton and Brereton 2020). However GZRRC is committed to providing the same level of ardent care and welfare to species from all branches of the animal kingdom. This includes several species of reptiles, amphibians, fish, birds and mammals. The collection plan for GZRRC is designed to include some of the most vulnerable species that are threatened in India as well as globally. The collection plan for GZRRC aims to reflect its commitment to global biodiversity conservation. GZRRC will focus its efforts on the *in-situ* as well as *ex-situ* conservation of all species listed in its collection plan by launching conservation initiatives for the said species in their range countries. Collection planning for zoos has been a field of active research that has been explored by several leading experts in the past two decades (Powell 2019). Modern zoos are leading the charge when it comes to creating demographically stable captive populations of critically threatened species and releasing them into the wild. Hence collection planning of zoos will be one of the most crucial aspects that will integrate modern zoos into the “**One-Plan**” approach for biodiversity conservation (Traylor-Holzer, Leus, and Bauman 2019). Studies show that *ex-situ* conservation programmes for several bird species have been instrumental to the global conservation of avifauna (Rose 2021). Collection planning is a science that needs to consider the behavioural biology of the species

(Powell 2019; Harley 2022), master plan of the zoo, education needs of visitors (Moss and Esson 2010), along with the conservation value of the species and other logistical frameworks proposed by regulatory bodies (Krause and Robinson 2022).

### Current Inventory of GZRRC

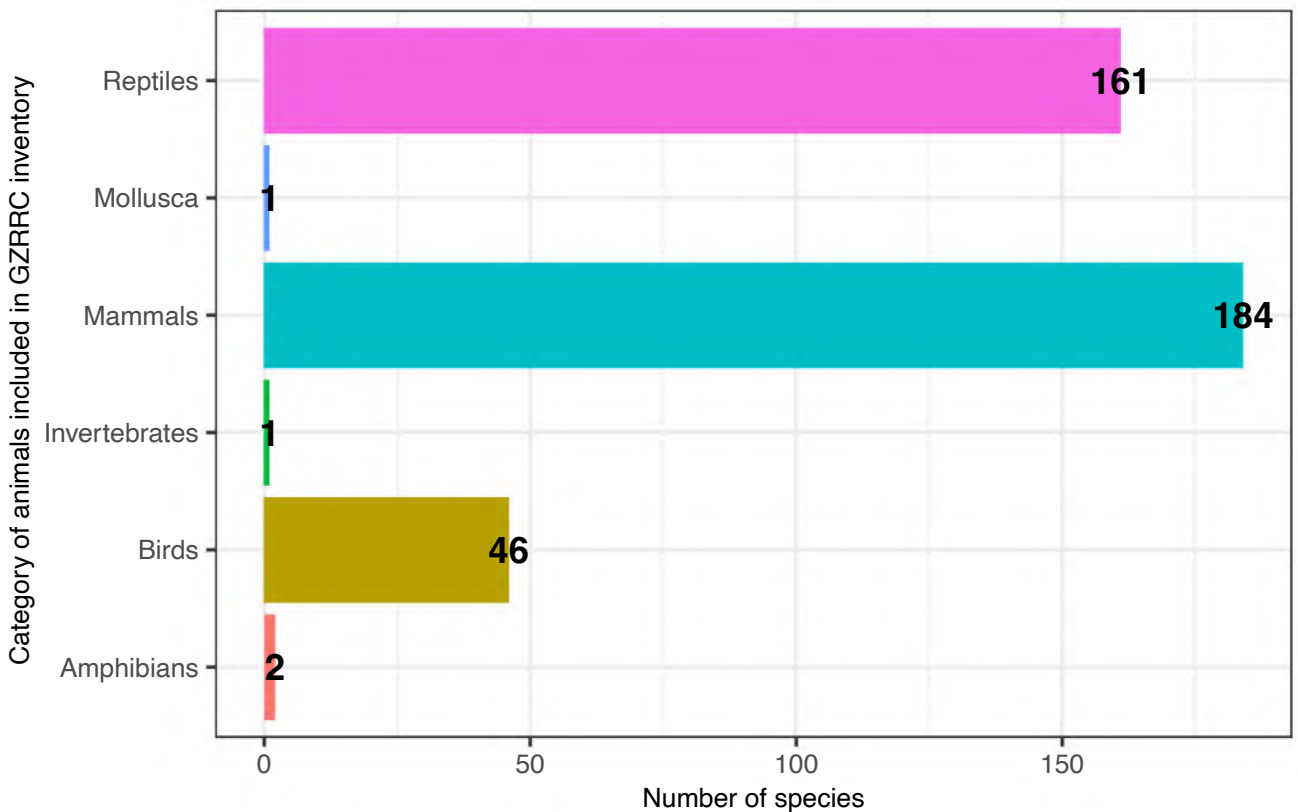


Figure 4.1: Current Animal Inventory of GZRRC as on 16.06.2024

The current inventory of GZRRC is a reflection of its proposed collection plan has 685 species of mammals, birds, and reptiles. In the near future, GZRRC will strive to acquire other species to fulfil its collection plan in order to serve its greater purpose of biodiversity conservation and public education. As of January 2024, GZRRC holds 11422 animals, which includes Invertebrates (3), Molluscs(950), Amphibians (16), Reptiles (5740), Birds (1373), Mammals (3340) . Most of the animals in the current inventory of GZRRC are rescued from national and international *ex-situ* organizations as a part of its animal welfare outreach programme that seeks to rehabilitate welfare-compromised captive animals from other captive facilities . GZRRC will partner with national and international partner organizations to acquire the species listed in its collection plan through exchange programs and donations. The GZRRC collection policy reflects its global vision for biodiversity conservation that will be implemented through the “One plan” approach for *in-situ/ex-situ* collaborative partnerships.

## Present Animal Collection Plan

GZRRC has designed a collection plan that spans over 685 species representing 173 Mammals, 102 Birds, 122 Reptiles, 42 Amphibians, as well as 106 invertebrates, and 140 fishes.

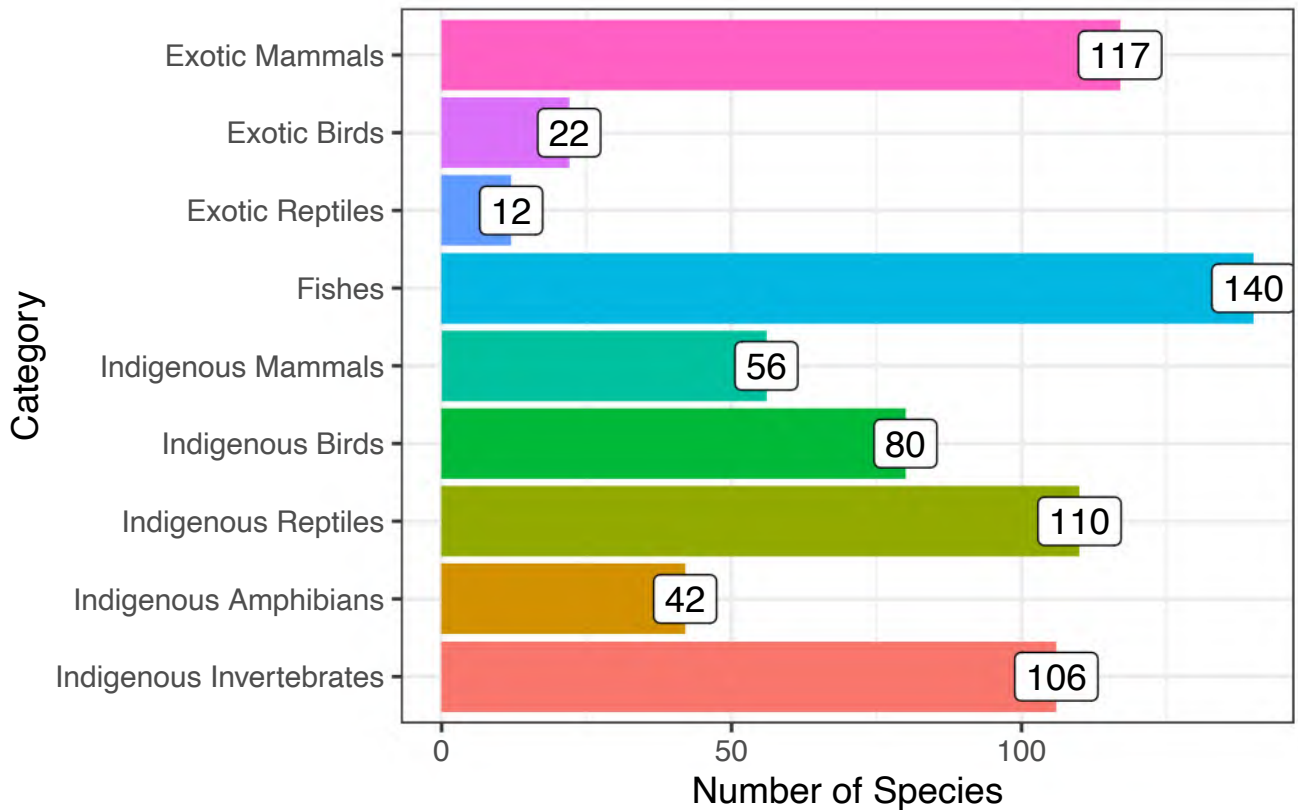


Figure 4.2: Categorization species included in the proposed collection plan for the Zoological Park of GZRRC

The species included in the collection plan have been chosen after thorough examination of the immediate needs of biodiversity conservation across all parts of the globe. The collection plan of GZRRC aims to fulfil its long-term and short-term conservation goals. According to recent studies conducted on the science of collection planning at modern zoos, most Global zoos have an average of 700 species in their collection plan with some like Berlin zoo with more than 1500 species (Krause and Robinson 2022). Most European and American zoos have species in their collection plans that are artefacts of their heritage (Krause and Robinson 2022) and not scientific collection planning. GZRRC on the other hand, uses stringent conservation-oriented criteria to select species for its collection plan. Unlike GZRRC, most of the species in European and American zoos have not been included in their collection plan based on their education or conservation value (Krause and Robinson 2022). In accordance with the EAZA policy guidelines for population management, zoos should consider the following points before including any species in their collection plan. The European Association of

Zoos and Aquariums lists the following criteria for inclusion of species within the collection plan of a zoo (EAZA 2012).

1. Husbandry expertise.
2. Reproduction factors.
3. Availability.
4. Demand within CZA.
5. Institutional commitment.
6. Availability and feasibility of potential founders.
7. Scientific and research potential.
8. Exhibit value.
9. Educational value.
10. Taxonomic uniqueness.
11. Risk of losing the *ex-situ* population.
12. Link to *in-situ* conservation.
13. Acquisition costs.
14. International or national program, studbook.

## Exotic Species

The GZRRC collection plan includes 151 Exotic species of Bird, Reptiles and Mammals, which reflects 22% of the total animal collection plan of the zoological park. GZRRC aims to become a pan-global *ex-situ* conservation institution and the collection plan is a reflection of its vision. The collection plan includes these exotic species based on the following criteria:

- Biodiversity conservation
- Animal welfare
- Education programmes

The GZRRC collection plan includes exotic animals that are critically threatened in their native ranges. GZRRC will work towards the long-term conservation of the exotic species by linking *ex-situ* and *in-situ* approaches through scientific species-management techniques. GZRRC will work towards creating a demographically stable and behaviourally capable of all critically endangered species in its collection plan and work with concerned countries for their eventual reintroduction to native habitats.

Humane treatment of animals and their welfare is one of the key missions of GZRRC, therefore GZRRC will also rescue and provide for the long-term care and welfare of exotic species from dilapidated zoos from other parts of the world. GZRRC will work with wildlife specialists for each of these species to help restore habitats for the eventual reintroduction of the captive population (Spiezio et al. 2022). Studies show that collection planning at zoos is related to knowledge outcomes of visitors (Moss and Esson 2010). Therefore, good collection planning is vital for the achievement of education goals of the organization. Since GZRRC aims to become a leading organization imparting conservation education to local and global audiences, its collection plan will need to meet all education goals. One of the primary education goal of GZRRC is to impart holistic education to all visitors to make them pro-conservation ambassadors. The collection plan of GZRRC reflects its global outlook towards proliferating this culture for conservation.

### The Proposed Animal Collection Plan of GZRRC

Here we present the collection plan of GZRRC for the next ten years. The collection list is furnished along with the details of the current and proposed inventory requirement for the species. The collection list is carefully formulated to meet the long-term conservation and education goals for GZRRC. Since this master plan is for a period of twenty years, the GZRRC collection list includes some of the species that will require increased conservation efforts *in-situ* and *ex-situ* in the near future.

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
<b>Exotic Reptiles</b>														
1	Aldabra Giant Tortoise	<i>Aldabrachelys gigantea</i>	3	3	0	6	0	0	0	0	3	3	0	6
2	American Alligator	<i>Alligator mississippiensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
3	Bearded dragon	<i>Pogona sp</i>	2	3	0	5	0	0	0	0	2	3	0	5
4	Blue tongued skink	<i>Tiliqua sp</i>	2	3	0	5	0	0	0	0	2	3	0	5

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
5	Dwarf caiman	<i>Paleosuchus palpebrosus</i>	2	3	0	5	0	0	0	0	2	3	0	5
6	Green Iguana	<i>Iguana iguana</i>	2	3	0	5	0	0	0	0	2	3	0	5
7	Green basilisk	<i>Basiliscus plumifrons</i>	2	3	0	5	0	0	0	0	2	3	0	5
8	Jackson's chameleon	<i>Trioceros jacksonii</i>	2	3	0	5	0	0	0	0	2	3	0	5
9	Komodo dragon	<i>Varanus komodoensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
10	Morelets crocodile	<i>Crocodylus moreletii</i>	2	3	0	5	0	0	0	0	2	3	0	5
11	Nile crocodile	<i>Crocodylus niloticus</i>	2	3	NA	5	0	0	0	0	2	3	NA	5
12	Siamese crocodile	<i>Crocodylus siamensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
<b>Exotic birds</b>														
13	African Penguin	<i>Spheniscus demersus</i>	3	3	0	6	0	0	0	0	3	3	0	6
14	Black and White Hawk Eagle	<i>Spizaetus melanoleucus</i>	3	3	0	6	0	0	0	0	3	3	0	6
15	Chilean Flamingo	<i>Phoenicopterus chilensis</i>	20	20	0	40	0	0	0	0	20	20	0	40
16	Cock of the Rock	<i>Rupicola Sp</i>	3	3	0	6	0	0	0	0	3	3	0	6
17	Gentoos Penguins	<i>Pygoscelis papua</i>	15	15	0	30	0	0	0	0	15	15	0	30
18	Glossy Cockatoos	<i>Calyptorhynchus lathami</i>	1	1	0	2	0	0	0	0	1	1	0	2
19	Harpy Eagle	<i>Harpia harpyja</i>	3	3	0	6	0	0	0	0	3	3	0	6
20	Horned Guan	<i>Oreophasis derbianus</i>	1	1	0	2	0	0	0	0	1	1	0	2
21	Humboldt Penguin	<i>Spheniscus humboldti</i>	3	3	0	6	0	0	0	0	3	3	0	6
22	Keel Billed Toucans	<i>Ramphastos sulfuratus</i>	5	5	0	10	0	0	0	0	5	5	0	10

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
23	Magallanes Penguin	<i>Spheniscus magellanicus</i>	15	15	0	30	0	0	0	0	15	15	0	30
24	Ostrich	<i>Struthio sp</i>	3	3	0	6	0	0	0	0	3	3	0	6
25	Pale Winged Trumpeter *	<i>Psophia leucoptera</i>	3	3	0	6	0	0	0	0	3	3	0	6
26	Quetzal	<i>Pharomachrus sp</i>	3	3	0	6	0	0	0	0	3	3	0	6
27	Red Vented Cockatoos	<i>Cacatua haematuropygia</i>	2	2	0	4	0	0	0	0	2	2	0	4
28	Ring Necked Pheasant	<i>Phasianus colchicus</i>	1	3	0	4	0	0	0	0	1	3	0	4
29	Secretray Bird	<i>Sagittarius serpentarius</i>	3	3	0	6	0	0	0	0	3	3	0	6
30	Shoebill Stork	<i>Balaeniceps rex</i>	1	1	0	2	0	0	0	0	1	1	0	2
31	St. Lucia Amazon's	<i>Amazona versicolor</i>	1	1	0	2	0	0	0	0	1	1	0	2
32	St. Vincent Amzaon's	<i>Amazona guildingii</i>	1	1	0	2	0	0	0	0	1	1	0	2
33	Umbrella Bird	<i>Cephalopterus sp</i>	1	1	0	2	0	0	0	0	1	1	0	2
34	White tail Cockatoos	<i>Zanda latirostris</i>	1	1	0	2	0	0	0	0	1	1	0	2
<b>Exotic mammals</b>														
35	Addax	<i>Arabian</i>	3	7	0	10	0	0	0	0	3	7	0	10
36	African Cape Buffaloes	<i>Syncerus caffer</i>	5	5	0	10	0	0	0	0	5	5	0	10
37	American Tapir	<i>Tapirus terrestris</i>	1	1	0	2	0	0	0	0	1	1	0	2
38	American brown bear	<i>Ursus arctos horribilis</i>	2	1	0	3	0	0	0	0	2	1	0	3
39	Amur leopard	<i>Panthera pardus orientalis</i>	1	1	0	2	0	0	0	0	1	1	0	2
40	Arabian Oryx	<i>Oryx leucoryx</i>	5	15	0	20	0	0	0	0	5	15	0	20
41	Babirusa	<i>Babyrousa babyrussa</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
42	Baboon	<i>Papio sp</i>	5	5	0	10	0	0	0	0	5	5	0	10
43	Baired's tapir	<i>Tapirus bairdii</i>	3	3	0	6	0	0	0	0	3	3	0	6
44	Barbary Sheep	<i>Ammotragus lervia</i>	3	7	0	10	0	0	0	0	3	7	0	10
45	Bighorn sheep	<i>Ovis canadensis</i>	3	7	0	10	0	0	0	0	3	7	0	10
46	Black Panther	<i>Panthera pardus or Panthera onca</i>	1	1	0	2	0	0	0	0	1	1	0	2
47	Black Rhino	<i>Diceros bicornis</i>	3	3	0	6	0	0	0	0	3	3	0	6
48	Black lion Tamarin	<i>Leontopithecus chrysopygus</i>	5	5	0	10	0	0	0	0	5	5	0	10
49	Black ruffed Lemur	<i>Varecia variegata</i>	2	2	0	4	0	0	0	0	2	2	0	4
50	Blesbok	<i>Damaliscus pygargus phillipsi</i>	3	7	0	10	0	0	0	0	3	7	0	10
51	Blue monkey	<i>Cercopithecus mitis</i>	2	2	0	4	0	0	0	0	2	2	0	4
52	Bongo	<i>Tragelaphus eurycerus</i>	3	7	0	10	0	0	0	0	3	7	0	10
53	Bonobo	<i>Pan paniscus</i>	4	6	0	10	0	0	0	0	4	6	0	10
54	Bontebok	<i>Damaliscus pygargus</i>	4	12	0	16	0	0	0	0	4	12	0	16
55	Bush Dog	<i>Speothos venaticus</i>	1	2	0	3	0	0	0	0	1	2	0	3
56	Capybara	<i>Hydrochoerus hydrochaeris</i>	5	10	0	15	0	0	0	0	5	10	0	15
57	Chilean pudu	<i>Pudu puda</i>	3	3	0	6	0	0	0	0	3	3	0	6
58	Chimpanzee	<i>Pan troglodytes</i>	5	7	0	12	0	0	0	0	5	7	0	12
59	Chinese muntjack	<i>Muntiacus reevesi</i>	3	7	0	10	0	0	0	0	3	7	0	10
60	Coatimundi	<i>Nasua nasua</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
61	Colobus monkey	<i>Colobus sp</i>	3	3	0	6	0	0	0	0	3	3	0	6
62	Common eland	<i>Tragelaphus oryx</i>	4	6	0	10	0	0	0	0	4	6	0	10
63	Common waterbuck	<i>Kobus ellipsiprymnus</i>	3	7	0	10	0	0	0	0	3	7	0	10
64	Dama gazel	<i>Nanger dama</i>	3	7	0	10	0	0	0	0	3	7	0	10
65	De Brazza monkey	<i>Cercopithecus neglectus</i>	1	3	0	4	0	0	0	0	1	3	0	4
66	Defassa waterbuck	<i>Kobus ellipsiprymnus defassa</i>	3	7	0	10	0	0	0	0	3	7	0	10
67	Dik dik	<i>Madoqua sp</i>	3	7	0	10	0	0	0	0	3	7	0	10
68	Emperor marmoset	<i>Callithrix jacchus</i>	3	3	0	6	0	0	0	0	3	3	0	6
69	Emperor tamarin	<i>Saguinus imperator</i>	5	5	0	10	0	0	0	0	5	5	0	10
70	European elk*	<i>Alces alces</i>	3	3	0	6	0	0	0	0	3	3	0	6
71	Fallow deer	<i>Dama dama</i>	5	5	0	10	0	0	0	0	5	5	0	10
72	Fossa	<i>Cryptoprocta ferox</i>	1	1	0	2	0	0	0	0	1	1	0	2
73	Gemsbock	<i>Oryx gazela</i>	3	7	0	10	0	0	0	0	3	7	0	10
74	Giant South American Anteater	<i>Myrmecophaga tridactyla</i>	2	2	0	4	0	0	0	0	2	2	0	4
75	Goeldi's marmoset	<i>Callimico goeldii</i>	3	3	0	6	0	0	0	0	3	3	0	6
76	Goitered Gazelle	<i>Gazella subgutturosa</i>	4	6	0	10	0	0	0	0	4	6	0	10
77	Golden bellied Mengaby	<i>Cercocebus chrysogaster</i>	3	3	0	6	0	0	0	0	3	3	0	6
78	Golden lion tamarin	<i>Leontopithecus rosalia</i>	6	6	0	12	0	0	0	0	6	6	0	12
79	Gorilla	<i>Gorilla gorilla</i>	4	8	0	12	0	0	0	0	4	8	0	12

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
80	Greater Spot nosed monkey	<i>Cercopithecus nictitans</i>	2	2	0	4	0	0	0	0	2	2	0	4
81	Greater kudu	<i>Tragelaphus strepsiceros</i>	3	7	0	10	0	0	0	0	3	7	0	10
82	Grey Kangaroo	<i>Macropus giganteus</i>	3	3	0	6	0	0	0	0	3	3	0	6
83	Guanaco	<i>Lama guanicoe</i>	3	7	0	10	0	0	0	0	3	7	0	10
84	Hamlyn's monkey	<i>Cercopithecus hamlyni</i>	1	2	0	3	0	0	0	0	1	2	0	3
85	Hippopotamus	<i>Hippopotamus amphibius</i>	2	4	0	6	0	0	0	0	2	4	0	6
86	Howler Monkey	<i>Alouatta</i>	3	3	0	6	0	0	0	0	3	3	0	6
87	Impala	<i>Aepyceros melampus</i>	3	7	0	10	0	0	0	0	3	7	0	10
88	Jaguar	<i>Panthera onca</i>	1	1	0	2	0	0	0	0	1	1	0	2
89	Jaguarundi	<i>Puma yagouarundi</i>	1	1	0	2	0	0	0	0	1	1	0	2
90	Kafue Flats lechwe	<i>Kobus leche</i>	3	7	0	10	0	0	0	0	3	7	0	10
91	Koala	<i>Phascolarctos cinereus</i>	2	2	0	4	0	0	0	0	2	2	0	4
92	L' Hoest's Monkey	<i>Allochrocebus lhoesti</i>	1	2	0	3	0	0	0	0	1	2	0	3
93	Lechwe	<i>Kobus megaceros</i>	3	7	0	10	0	0	0	0	3	7	0	10
94	Lesser kudu	<i>Tragelaphus imberbis</i>	3	7	0	10	0	0	0	0	3	7	0	10
95	Lowland nyala	<i>Nyala angasii</i>	3	7	0	10	0	0	0	0	3	7	0	10
96	Malayan Tapir	<i>Tapirus indicus</i>	2	4	0	6	0	0	0	0	2	4	0	6
97	Mandrill	<i>Mandrillus sphinx</i>	4	8	0	12	0	0	0	0	4	8	0	12
98	Maned wolf	<i>Chrysocyon brachyurus</i>	1	1	0	2	0	0	0	0	1	1	0	2

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
99	Margay	<i>Leopardus wiedii</i>	1	1	0	2	0	0	0	0	1	1	0	2
100	Masai Giraffe	<i>Giraffa camelopardalis tippelskirchi</i>	3	7	0	10	0	0	0	0	3	7	0	10
101	Mexican hairy dwarf porcupine	<i>Sphiggurus mexicanus</i>	3	3	0	6	0	0	0	0	3	3	0	6
102	Mouflon	<i>Ovis gmelini</i>	3	7	0	10	0	0	0	0	3	7	0	10
103	Mountain Reedbuck	<i>Redunca fulvorufula</i>	3	7	0	10	0	0	0	0	3	7	0	10
104	Nancymae' owl monkey	<i>Aotus nancymaeae</i>	2	2	0	4	0	0	0	0	2	2	0	4
105	North American black bear	<i>Ursus americanus</i>	2	2	0	4	0	0	0	0	2	2	0	4
106	Northern Pudu	<i>Pudu mephistophiles</i>	1	1	0	2	0	0	0	0	1	1	0	2
107	Ocelot	<i>Leopardus pardalis</i>	1	1	0	2	0	0	0	0	1	1	0	2
108	Okapi	<i>Okapia johnstoni</i>	2	2	0	4	0	0	0	0	2	2	0	4
109	Orangutans	<i>Pongo sp.</i>	4	8	0	12	0	0	0	0	4	8	0	12
110	Patagonian Mara	<i>Dolichotis</i>	3	9	0	12	0	0	0	0	3	9	0	12
111	Patas Monkey	<i>Erythrocebus patas</i>	4	4	0	8	0	0	0	0	4	4	0	8
112	Pere David's deer	<i>Elaphurus davidianus</i>	3	7	0	10	0	0	0	0	3	7	0	10
113	Proboscis Monkey	<i>Nasalis larvatus</i>	1	2	0	3	0	0	0	0	1	2	0	3
114	Przewalski's horse	<i>Equus przewalskii</i>	2	4	0	6	0	0	0	0	2	4	0	6
115	Puma	<i>Puma concolor</i>	1	1	0	2	0	0	0	0	1	1	0	2
116	Pygmy Hippo	<i>Choeropsis liberiensis</i>	2	2	0	4	0	0	0	0	2	2	0	4
117	Red Kangaroo	<i>Macropus rufus</i>	2	4	0	6	0	0	0	0	2	4	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
118	Red deer	<i>Cervus elaphus</i>	3	7	0	10	0	0	0	0	3	7	0	10
119	Red river hog	<i>Potamochoerus porcus</i>	3	5	0	8	0	0	0	0	3	5	0	8
120	Red ruffed Lemur	<i>Varecia rubra</i>	2	2	0	4	0	0	0	0	2	2	0	4
121	Red tailed monkey	<i>Cercopithecus ascanius</i>	2	2	0	4	0	0	0	0	2	2	0	4
122	Ring tailed Lemur	<i>Lemur catta</i>	10	10	0	20	0	0	0	0	10	10	0	20
123	Roan Antelope	<i>Hippotragus equinus</i>	4	6	0	10	0	0	0	0	4	6	0	10
124	Sable antelope	<i>Hippotragus niger</i>	3	7	0	10	0	0	0	0	3	7	0	10
125	Saiga	<i>Saiga tatarica</i>	10	30	0	40	0	0	0	0	10	30	0	40
126	Saki Monkey	<i>Pithecia</i>	2	4	0	6	0	0	0	0	2	4	0	6
127	Scimitar Oryx	<i>Oryx dammah</i>	3	7	0	10	0	0	0	0	3	7	0	10
128	Sea lion	<i>Zalophus californianus</i>	2	4	0	6	0	0	0	0	2	4	0	6
129	Sika deer	<i>Cervus nippon</i>	4	6	0	10	0	0	0	0	4	6	0	10
130	Sitatunga	<i>Tragelaphus spekii</i>	5	5	0	10	0	0	0	0	5	5	0	10
131	Somali wild horse	<i>Equus africanus somaliensis</i>	2	4	0	6	0	0	0	0	2	4	0	6
132	Southern african lion	<i>Panthera leo melanochaita</i>	2	4	0	6	0	0	0	0	2	4	0	6
133	Spider Monkey	<i>Ateles</i>	1	2	0	3	0	0	0	0	1	2	0	3
134	Squirrel Monkey	<i>Saimiri</i>	4	4	0	8	0	0	0	0	4	4	0	8
135	Sumatran Tiger	<i>Panthera tigris sumatrae</i>	1	1	0	2	0	0	0	0	1	1	0	2
136	Talapoin Monkey	<i>Miopithecus sp</i>	2	2	0	4	0	0	0	0	2	2	0	4

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
137	Tamandua	<i>Tamandua mexicana</i>	1	1	0	2	0	0	0	0	1	1	0	2
138	Tasmanian Devil	<i>Sarcophilus harrisii</i>	3	3	0	6	0	0	0	0	3	3	0	6
139	Thomson Gazelle	<i>Eudorcas thomsonii</i>	5	15	0	20	0	0	0	0	5	15	0	20
140	Tree Kangaroo	<i>Dendrolagus sp.</i>	3	3	0	6	0	0	0	0	3	3	0	6
141	Two Toed Sloth	<i>Choloepus sp.</i>	3	3	0	6	0	0	0	0	3	3	0	6
142	Uakari Monkey	<i>Cacajao calvus</i>	2	2	0	4	0	0	0	0	2	2	0	4
143	Wapiti	<i>Cervus canadensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
144	Water deer	<i>Hydropotes inermis</i>	3	3	0	6	0	0	0	0	3	3	0	6
145	White Rhino	<i>Ceratotherium simum</i>	3	3	0	6	0	0	0	0	3	3	0	6
146	White faced Capuchin monkey	<i>Cebus imitator</i>	4	4	0	8	0	0	0	0	4	4	0	8
147	White lion	<i>Panthera leo melanochaita</i>	1	2	0	3	0	0	0	0	1	2	0	3
148	Wildebeest	<i>Connochaetes taurinus</i>	10	10	0	20	0	0	0	0	10	10	0	20
149	Wombat	<i>Lasiiorhinus sp.</i>	2	2	0	4	0	0	0	0	2	2	0	4
150	Woolly monkey	<i>Lagothrix sp.</i>	2	2	0	4	0	0	0	0	2	2	0	4
151	Zebra	<i>Equus sp.</i>	3	7	0	10	0	0	0	0	3	7	0	10
<b>Fishes</b>														
152	Almorha loach	<i>Botia almorhae</i>	10	10	0	20	0	0	0	0	10	10	0	20
153	Angra labeo	<i>Labeo angra</i>	10	10	0	20	0	0	0	0	10	10	0	20
154	Asiatic snakehead	<i>Channa orientalis</i>	10	10	0	20	0	0	0	0	10	10	0	20
155	Assamese kingfish	<i>Cyprinion semiplotum</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
156	Attentive carplet	<i>Amblypharyngodon melettinus</i>	10	0	20	0	0	0	0	10	10	0	20	
157	Banded snakehead	<i>Channa striata</i>	10	10	0	20	0	0	0	10	10	0	20	
158	Bata labeo	<i>Labeo bata</i>	10	10	0	20	0	0	0	10	10	0	20	
159	Batasio	<i>Batasio sp</i>	10	10	0	20	0	0	0	10	10	0	20	
160	Bengal mudeel	<i>Ophisternon bengalense</i>	10	10	0	20	0	0	0	10	10	0	20	
161	Bengala barb	<i>Megarasbora elanga</i>	10	10	0	20	0	0	0	10	10	0	20	
162	Bili-meenu	<i>Tor khudree</i>	10	10	0	20	0	0	0	10	10	0	20	
163	Birdi loach	<i>Botia birdi</i>	10	10	0	20	0	0	0	10	10	0	20	
164	Black Horabagrus	<i>Horabagrus melanosoma</i>	10	10	0	20	0	0	0	10	10	0	20	
165	Black-spot barb	<i>Dawkinsia filamentosa</i>	10	10	0	20	0	0	0	10	10	0	20	
166	Blue panchax	<i>Aplocheilichthys panchax</i>	10	10	0	20	0	0	0	10	10	0	20	
167	Boga labeo	<i>Labeo boga</i>	10	10	0	20	0	0	0	10	10	0	20	
168	Bombay labeo	<i>Labeo porcellus</i>	10	10	0	20	0	0	0	10	10	0	20	
169	Bothua	<i>Channa gachua</i>	10	10	0	20	0	0	0	10	10	0	20	
170	Bullseye snakehead	<i>Channa marulius</i>	10	10	0	20	0	0	0	10	10	0	20	
171	Burmese carplet	<i>Amblypharyngodon atkinsonii</i>	10	0	20	0	0	0	0	10	10	0	20	
172	Burmese loach	<i>Balitora burmanica</i>	10	10	0	20	0	0	0	10	10	0	20	
173	Burmese pufferfish	<i>Tetraodon nigroviridis</i>	10	10	0	20	0	0	0	10	10	0	20	
174	Canine catfish-eel	<i>Plotosus canius</i>	10	10	0	20	0	0	0	10	10	0	20	
175	Carnatica carp	<i>Hypsleobarbus carnaticus</i>	10	10	0	20	0	0	0	10	10	0	20	
176	Cat fish sp.	<i>Plicofollis dussumieri</i>	10	10	0	20	0	0	0	10	10	0	20	

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
177	Catla	<i>Gibelion catla</i>	10	10	0	20	0	0	0	0	10	10	0	20
178	Chandkas barb	<i>Osteochilus nashii</i>	10	10	0	20	0	0	0	0	10	10	0	20
179	Climbing perch	<i>Anabas testudineus</i>	10	10	0	20	0	0	0	0	10	10	0	20
180	Commerson's glassy perchlet	<i>Ambassis ambassis</i>	10	10	0	20	0	0	0	0	10	10	0	20
181	Crocodile-tooth pipefish	<i>Microphis cunocalus</i>	10	10	0	20	0	0	0	0	10	10	0	20
182	Cuchia	<i>Monopterusuchia</i>	10	10	0	20	0	0	0	0	10	10	0	20
183	Curmuca barb	<i>Hypselobarbus curmuca</i>	10	10	0	20	0	0	0	0	10	10	0	20
184	Deccan labeo	<i>Labeo kawrus</i>	10	10	0	20	0	0	0	0	10	10	0	20
185	Denison barb	<i>Sahyadria denisonii</i>	10	10	0	20	0	0	0	0	10	10	0	20
186	Deocata pipefish	<i>Microphis deocata</i>	10	10	0	20	0	0	0	0	10	10	0	20
187	Dwarf gourami	<i>Trichogaster lalius</i>	10	10	0	20	0	0	0	0	10	10	0	20
188	Ectuntio halfbeak	<i>Zenarchopterus ectuntio</i>	10	10	0	20	0	0	0	0	10	10	0	20
189	Feather back	<i>Notopterus notopterus</i>	10	10	0	20	0	0	0	0	10	10	0	20
190	Flathead mullet	<i>Mugil cephalus</i>	10	10	0	20	0	0	0	0	10	10	0	20
191	Flathead sleeper	<i>Ophiocara porocephala</i>	10	10	0	20	0	0	0	0	10	10	0	20
192	Fresh water ray	<i>Urogymnus polylepis</i>	10	10	0	20	0	0	0	0	10	10	0	20
193	Freshwater garfish	<i>Xenentodon cancila</i>	10	10	0	20	0	0	0	0	10	10	0	20
194	Freshwater moray	<i>Gymnothorax tile</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
195	Fringed-lipped peninsula carp	<i>Labeo fimbriatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
196	Gangetic ailia	<i>Ailia coila</i>	10	10	0	20	0	0	0	0	10	10	0	20
197	Gangetic goonch	<i>Bagarius bagarius</i>	10	10	0	20	0	0	0	0	10	10	0	20
198	Gangetic koi	<i>Anabas cobojius</i>	10	10	0	20	0	0	0	0	10	10	0	20
199	Gangetic latia	<i>Crossocheilus latius</i>	10	10	0	20	0	0	0	0	10	10	0	20
200	Gangetic mystus	<i>Mystus cavasius</i>	10	10	0	20	0	0	0	0	10	10	0	20
201	Giant danio	<i>Devario aequipinnatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
202	Giant gourami	<i>Osphronemus goramy</i>	10	10	0	20	0	0	0	0	10	10	0	20
203	Goan catfish	<i>Ompok malabaricus</i>	10	10	0	20	0	0	0	0	10	10	0	20
204	Goonch	<i>Bagarius yarrelli</i>	10	10	0	20	0	0	0	0	10	10	0	20
205	Green chromide	<i>Etroplus suratensis</i>	10	10	0	20	0	0	0	0	10	10	0	20
206	Green panchax	<i>Aplocheilichthys blockii</i>	10	10	0	20	0	0	0	0	10	10	0	20
207	Green pufferfish	<i>Dichotomys fluvialis</i>	10	10	0	20	0	0	0	0	10	10	0	20
208	Günther's catfish	<i>Horabagrus brachysoma</i>	10	10	0	20	0	0	0	0	10	10	0	20
209	Indian butter-catfish	<i>Ompok bimaculatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
210	Indian carplet	<i>Amblypharyngodon microlepis</i>	10	10	0	20	0	0	0	0	10	10	0	20
211	Indian longfin eel	<i>Anguilla bengalensis</i>	10	10	0	20	0	0	0	0	10	10	0	20
212	Indian paradisefish	<i>Ctenopoma nobilis</i>	10	10	0	20	0	0	0	0	10	10	0	20
213	Indian rohu	<i>Labeo rohita</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
214	Jerdon's baril	<i>Barilius bakeri</i>	10	10	0	20	0	0	0	0	10	10	0	20
215	Jerdon's carp	<i>Hypseobarbus jerdonii</i>	10	10	0	20	0	0	0	0	10	10	0	20
216	Kakila	<i>Xenentodon cancila</i>	10	10	0	20	0	0	0	0	10	10	0	20
217	Kalkkari	<i>Glyptothorax housei</i>	10	10	0	20	0	0	0	0	10	10	0	20
218	Kalkkari Sp.	<i>Glyptothorax spp.</i>	10	10	0	20	0	0	0	0	10	10	0	20
219	Karimpachi	<i>Crossocheilus periyarensis</i>	10	10	0	20	0	0	0	0	10	10	0	20
220	Karnataka labeo	<i>Labeo calbasu</i>	10	10	0	20	0	0	0	0	10	10	0	20
221	Keletius mystus	<i>Mystus keletius</i>	10	10	0	20	0	0	0	0	10	10	0	20
222	Kerala mystus	<i>Mystus keralai</i>	10	10	0	20	0	0	0	0	10	10	0	20
223	Kolus	<i>Hypseobarbus kolus</i>	10	10	0	20	0	0	0	0	10	10	0	20
224	Korhi barb	<i>Hypseobarbus micropogon</i>	10	10	0	20	0	0	0	0	10	10	0	20
225	Krishna carp	<i>Hypseobarbus dobsoni</i>	10	10	0	20	0	0	0	0	10	10	0	20
226	Kuria labeo	<i>Labeo gonius</i>	10	10	0	20	0	0	0	0	10	10	0	20
227	Long fin Kerala barb	<i>Puntius dolichopterus</i>	10	10	0	20	0	0	0	0	10	10	0	20
228	Long-whiskered catfish	<i>Sperata aor</i>	10	10	0	20	0	0	0	0	10	10	0	20
229	Magur	<i>Clarias batrachus</i>	10	10	0	20	0	0	0	0	10	10	0	20
230	Mahseer sp.	<i>Hypseobarbus mussullah</i>	10	10	0	20	0	0	0	0	10	10	0	20
231	Malabar baril	<i>Barilius bakeri</i>	10	10	0	20	0	0	0	0	10	10	0	20
232	Malabar danio	<i>Devario malabaricus</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
233	Malabar glassy perchlet	<i>Ambassis dussumieri</i>	10	10	0	20	0	0	0	0	10	10	0	20
234	Malabar killie	<i>Aplocheilus lineatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
235	Malabar mahseer	<i>Tor malabaricus</i>	10	10	0	20	0	0	0	0	10	10	0	20
236	Malabar pufferfish	<i>Carinotetraodon travancoricus</i>	10	10	0	20	0	0	0	0	10	10	0	20
237	Malabar snakehead	<i>Channa diplogramma</i>	10	10	0	20	0	0	0	0	10	10	0	20
238	Malabar spinyee	<i>Macrogathus guentheri</i>	10	10	0	20	0	0	0	0	10	10	0	20
239	Manjakoori	<i>Horabagrus nigricollaris</i>	10	10	0	20	0	0	0	0	10	10	0	20
240	Marine ray	<i>Batoidea sp.</i>	10	10	0	20	0	0	0	0	10	10	0	20
241	Melon barb	<i>Haludaria fasciata</i>	10	10	0	20	0	0	0	0	10	10	0	20
242	Menoda catfish	<i>Hemibagrus menoda</i>	10	10	0	20	0	0	0	0	10	10	0	20
243	Milkfish	<i>Chanos chanos</i>	10	10	0	20	0	0	0	0	10	10	0	20
244	Mola carplet	<i>Amblypharyngodon mola</i>	10	10	0	20	0	0	0	0	10	10	0	20
245	Mrigal	<i>Cirrhinus cirrhosus</i>	10	10	0	20	0	0	0	0	10	10	0	20
246	Mud skipper	<i>Boleophthalmus dussumier</i>	10	10	0	20	0	0	0	0	10	10	0	20
247	Mullya garra	<i>Garra mullya</i>	10	10	0	20	0	0	0	0	10	10	0	20
248	Murree labeo	<i>Bangana diplostoma</i>	10	10	0	20	0	0	0	0	10	10	0	20
249	Mussullah mahseer	<i>Hypselobarbus mussullah</i>	10	10	0	20	0	0	0	0	10	10	0	20
250	Nandani	<i>Labeo nandina</i>	10	10	0	20	0	0	0	0	10	10	0	20
251	Necktie loach	<i>Botia dario</i>	10	10	0	20	0	0	0	0	10	10	0	20
252	Ocellated pufferfish	<i>Leiodon cutcutia</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
253	Oriental-sole	<i>Brachirus orientalis</i>	10	10	0	20	0	0	0	0	10	10	0	20
254	Oxeye tarpon	<i>Megalops cyprinoides</i>	10	10	0	20	0	0	0	0	10	10	0	20
255	Palmas stone loach	<i>Balitora laticauda</i>	10	10	0	20	0	0	0	0	10	10	0	20
256	Pangusia labeo	<i>Labeo pangusia</i>	10	10	0	20	0	0	0	0	10	10	0	20
257	Patharchatta	<i>Glyptothorax annandalei</i>	10	10	0	20	0	0	0	0	10	10	0	20
258	Peninsular olive barb	<i>Systomus sarana</i>	10	10	0	20	0	0	0	0	10	10	0	20
259	Pigmouth carp	<i>Labeo kontius</i>	10	10	0	20	0	0	0	0	10	10	0	20
260	Rajasthan labeo	<i>Labeo rajasthanicus</i>	10	10	0	20	0	0	0	0	10	10	0	20
261	Red finned kuruva	<i>Systomus rufus</i>	10	10	0	20	0	0	0	0	10	10	0	20
262	Red tipped half-beak	<i>Hyporhamphus xanthopterus</i>	10	10	0	20	0	0	0	0	10	10	0	20
263	Rita	<i>Rita rita</i>	10	10	0	20	0	0	0	0	10	10	0	20
264	Rock flagtail	<i>Kuhlia rupestris</i>	10	10	0	20	0	0	0	0	10	10	0	20
265	Roho labeo	<i>Labeo rohita</i>	10	10	0	20	0	0	0	0	10	10	0	20
266	Rosy barb	<i>Pethia conchoniuis</i>	10	10	0	20	0	0	0	0	10	10	0	20
267	Scarlet-banded barb	<i>Puntius amphibius</i>	10	10	0	20	0	0	0	0	10	10	0	20
268	Scribbled goby	<i>Awaous grammepomus</i>	10	10	0	20	0	0	0	0	10	10	0	20
269	Scribbled sp.	<i>Awaous guamensis</i>	10	10	0	20	0	0	0	0	10	10	0	20
270	Short nosed catfish	<i>Arius subrostratus</i>	10	10	0	20	0	0	0	0	10	10	0	20
271	Short-tailed pipefish	<i>Microphis brachyurus</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
272	Shortfin eel	<i>Anguilla bicolor</i>	10	10	0	20	0	0	0	0	10	10	0	20
273	Silas barb	<i>Dawkinsia arulius</i>	10	10	0	20	0	0	0	0	10	10	0	20
274	Silent Valley stone loach	<i>Balitora jalpalli</i>	10	10	0	20	0	0	0	0	10	10	0	20
275	Slender stone loach	<i>Balitora mysorensis</i>	10	10	0	20	0	0	0	0	10	10	0	20
276	Spotted catfish	<i>Arius maculatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
277	Spotted scat	<i>Scatophagus argus</i>	10	10	0	20	0	0	0	0	10	10	0	20
278	Spotted snakehead	<i>Channa punctata</i>	10	10	0	20	0	0	0	0	10	10	0	20
279	Tade mullet	<i>Plia iza planiceps</i>	10	10	0	20	0	0	0	0	10	10	0	20
280	Thelee	<i>Heteropneustes microps</i>	10	10	0	20	0	0	0	0	10	10	0	20
281	Thooli	<i>Labeo dussumieri</i>	10	10	0	20	0	0	0	0	10	10	0	20
282	Tiger loach	<i>Syncrossus hymenophysa</i>	10	10	0	20	0	0	0	0	10	10	0	20
283	Tire-track spinyeel	<i>Mastacembelus armatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
284	Tor mahseer	<i>Tor tor</i>	10	10	0	20	0	0	0	0	10	10	0	20
285	Travancore rock catfish	<i>Glyptothorax elankadensis</i>	10	10	0	20	0	0	0	0	10	10	0	20
286	Vagra baril	<i>Barilius vagra</i>	10	10	0	20	0	0	0	0	10	10	0	20
287	Valenciennes clariid	<i>Clarias dussumieri</i>	10	10	0	20	0	0	0	0	10	10	0	20
288	Wayanad leaffish	<i>Pristolepis pentacantha</i>	10	10	0	20	0	0	0	0	10	10	0	20
289	Y-loach	<i>Botia lohachata</i>	10	10	0	20	0	0	0	0	10	10	0	20
290	Yellow banded spiny eel	<i>Macrognathus fasciatus</i>	10	10	0	20	0	0	0	0	10	10	0	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
291	Zebra danio	<i>Danio rerio</i>	10	10	0	20	0	0	0	0	10	10	0	20
<b>Indigenous Amphibians</b>														
292	Amboli toad	<i>Xanthophryne tigerina</i>	3	3	0	6	0	0	0	0	3	3	0	6
293	Beautiful torrent frog	<i>Amolops formosus</i>	3	3	0	6	0	0	0	0	3	3	0	6
294	Beddome's bush frog	<i>Raorchestes beddomii</i>	3	3	0	6	0	0	0	0	3	3	0	6
295	Beddome's leaping frog	<i>Indirana beddomii</i>	3	3	0	6	0	0	0	0	3	3	0	6
296	Bicoloured frog	<i>Clinotarsus curtipes</i>	3	3	0	6	0	0	0	0	3	3	0	6
297	Black microhylid frog	<i>Melanobatrachus indicus</i>	3	3	0	6	0	0	0	0	3	3	0	6
298	Bombay caecilian	<i>Ichthyophis bombayensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
299	Chorla striped caecilian	<i>Ichthyophis davidi</i>	3	3	0	6	0	0	0	0	3	3	0	6
300	Common Toad	<i>Duttaphrynus amabilis</i>	3	3	0	6	0	0	0	0	3	3	0	6
301	Common golden backed frog	<i>Indosylvirana indica</i>	3	3	0	6	0	0	0	0	3	3	0	6
302	Common tree frog	<i>Polypedates maculatus</i>	3	3	0	6	0	0	0	0	3	3	0	6
303	Congaturi halfbeak	<i>Hyporhamphus limbatus</i>	10	10	0	20	0	0	0	0	10	10	0	20
304	Coorg yellow bush frog	<i>Raorchestes luteolus</i>	3	3	0	6	0	0	0	0	3	3	0	6
305	Crocodile newt	<i>Tylotriton verrucosus</i>	3	3	0	6	0	0	0	0	3	3	0	6
306	Deccan night frog	<i>Nyctibatrachus deccanensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
307	Eastern gegenophis	<i>Genenophis orientalis</i>	3	3	0	6	0	0	0	0	3	3	0	6
308	Fungoid frog	<i>Hydrophylax malabaricus</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
309	Indian balloon frog	<i>Uperodon globulosus</i>	3	3	0	6	0	0	0	0	3	3	0	6
310	Indian bullfrog	<i>Hoplobatrachus tigerinus</i>	3	3	0	6	0	0	0	0	3	3	0	6
311	Indian burrowing frog	<i>Sphaerotheca breviceps</i>	3	3	0	6	0	0	0	0	3	3	0	6
312	Kottigehar Dancing frog	<i>Micrixalus kottigeharensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
313	Large ghats tree frog	<i>Ghatixalus magnus</i>	3	3	0	6	0	0	0	0	3	3	0	6
314	Large golden backed frog	<i>Indosylvirana magna</i>	3	3	0	6	0	0	0	0	3	3	0	6
315	Lizard headed cricket frog	<i>Fejervarya sauriceps</i>	3	3	0	6	0	0	0	0	3	3	0	6
316	Malabar gliding frog	<i>Rhacophorus malabaricus</i>	3	3	0	6	0	0	0	0	3	3	0	6
317	Malabar toad	<i>Duttaphrynus hololius</i>	3	3	0	6	0	0	0	0	3	3	0	6
318	Malabar tree toad	<i>Pedostibes tuberculosus</i>	3	3	0	6	0	0	0	0	3	3	0	6
319	Marbled balloon frog	<i>Uperodon systoma</i>	3	3	0	6	0	0	0	0	3	3	0	6
320	Marbled toad	<i>Duttaphrynus stomaticus</i>	3	3	0	6	0	0	0	0	3	3	0	6
321	Myristica swamp frog	<i>Mercurana myristica-palustris</i>	3	3	0	6	0	0	0	0	3	3	0	6
322	Ornate narrow mouthed frog	<i>Microhyla ornata</i>	3	3	0	6	0	0	0	0	3	3	0	6
323	Ornate stream toad	<i>Ghatophryne ornata</i>	3	3	0	6	0	0	0	0	3	3	0	6
324	Painted balloon frog	<i>Uperodon taprobanicus</i>	3	3	0	6	0	0	0	0	3	3	0	6
325	Ponmudi bush frog	<i>Raorchestes ponmudi</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
326	Purple frog	<i>Nasikabatrachus sahyadrensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
327	Red stream toad	<i>Ghatophryne rubigina</i>	3	3	0	6	0	0	0	0	3	3	0	6
328	Skittering frog	<i>Euphlyctis cyanophlyctis</i>	3	3	0	6	0	0	0	0	3	3	0	6
329	Smith's leaf litter frog	<i>Leptobrachium smithi</i>	3	3	0	6	0	0	0	0	3	3	0	6
330	Spotted leaping frog	<i>Sallywalkerana diplosticta</i>	3	3	0	6	0	0	0	0	3	3	0	6
331	Star eyed tree frog	<i>Ghatixalus asterops</i>	3	3	0	6	0	0	0	0	3	3	0	6
332	Variogated balloon frog	<i>Uperodon variegatus</i>	3	3	0	6	0	0	0	0	3	3	0	6
333	Yellow striped frog	<i>Hylarana tyleri</i>	3	3	0	6	0	0	0	0	3	3	0	6
<b>Indigenous Invertebrates</b>														
334	African Babul Blue	<i>Azonus jesus</i>	0	0	20	20	0	0	0	0	0	0	20	20
335	Anomalous Nawab	<i>Charaxes agrarius</i>	0	0	20	20	0	0	0	0	0	0	20	20
336	Apefly	<i>Spalgis epius</i>	0	0	20	20	0	0	0	0	0	0	20	20
337	Baronet	<i>Euthalia nais</i>	0	0	20	20	0	0	0	0	0	0	20	20
338	Black-spotted Grass Jewel	<i>Freyeria putli</i>	0	0	20	20	0	0	0	0	0	0	20	20
339	Blue Mormon	<i>Papilio polymnestor</i>	0	0	20	20	0	0	0	0	0	0	20	20
340	Blue Pansy	<i>Junonia orithya</i>	0	0	20	20	0	0	0	0	0	0	20	20
341	Blue Tiger	<i>Tirumala limniace</i>	0	0	20	20	0	0	0	0	0	0	20	20
342	Bombay locust	<i>Nomadacris succincta</i>	0	0	30	30	0	0	0	0	0	0	30	30
343	Bright Babul Blue	<i>Azonus ubaldus</i>	0	0	20	20	0	0	0	0	0	0	20	20
344	Brown Awl	<i>Badamia exclamationis</i>	0	0	20	20	0	0	0	0	0	0	20	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
345	Centipedes	<i>Scolopendra hardwickei</i>	0	0	30	30	0	0	0	0	0	0	30	30
346	Common Albatross	<i>Appias albina</i>	0	0	20	20	0	0	0	0	0	0	20	20
347	Common Banded Awl	<i>Hasora chromus</i>	0	0	20	20	0	0	0	0	0	0	20	20
348	Common Baron	<i>Euthalia aconthea</i>	0	0	20	20	0	0	0	0	0	0	20	20
349	Common Castor	<i>Ariadne merione</i>	0	0	20	20	0	0	0	0	0	0	20	20
350	Common Crow	<i>Euploea core</i>	0	0	20	20	0	0	0	0	0	0	20	20
351	Common Emigrant	<i>Lemon Emigrant</i>	0	0	20	20	0	0	0	0	0	0	20	20
352	Common Evening Brown	<i>Melanitis leda</i>	0	0	20	20	0	0	0	0	0	0	20	20
353	Common Four-ring	<i>Ypthima huebneri</i>	0	0	20	20	0	0	0	0	0	0	20	20
354	Common Grass Yellow	<i>Eurema hecabe</i>	0	0	20	20	0	0	0	0	0	0	20	20
355	Common Gull	<i>Cepora nerissa</i>	0	0	20	20	0	0	0	0	0	0	20	20
356	Common Hedge Blue	<i>Acytoplepis puspa</i>	0	0	20	20	0	0	0	0	0	0	20	20
357	Common Jay	<i>Graphium doson</i>	0	0	20	20	0	0	0	0	0	0	20	20
358	Common Leopard	<i>Phalanta phalantha</i>	0	0	20	20	0	0	0	0	0	0	20	20
359	Common Mime	<i>Papilio clytia</i>	0	0	20	20	0	0	0	0	0	0	20	20
360	Common Mormon	<i>Papilio polytes</i>	0	0	20	20	0	0	0	0	0	0	20	20
361	Common Pierrot	<i>Castalius rosimon</i>	0	0	20	20	0	0	0	0	0	0	20	20
362	Common Red Flash	<i>Rapala iarbus</i>	0	0	20	20	0	0	0	0	0	0	20	20
363	Common Rose	<i>Pachliopta aristolochiae</i>	0	0	20	20	0	0	0	0	0	0	20	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
364	Common Sailer	<i>Neptis hylas</i>	0	0	20	20	0	0	0	0	0	0	20	20
365	Common Shot Silverline	<i>Spindasis ictis</i>	0	0	20	20	0	0	0	0	0	0	20	20
366	Common Silverline	<i>Cigaritis vulcanus</i>	0	0	20	20	0	0	0	0	0	0	20	20
367	Common Wanderer	<i>Pareronia valeria</i>	0	0	20	20	0	0	0	0	0	0	20	20
368	Conjoined Swift	<i>Pelopidas conjuncta</i>	0	0	20	20	0	0	0	0	0	0	20	20
369	Crickets	<i>Grylloides sigillatus</i>	0	0	30	30	0	0	0	0	0	0	30	30
370	Crimson-tip	<i>Colotis danae</i>	0	0	20	20	0	0	0	0	0	0	20	20
371	Danaid Eggfly	<i>Hypolimnas misippus</i>	0	0	20	20	0	0	0	0	0	0	20	20
372	Dark Cerulean	<i>Jamides bochus</i>	0	0	20	20	0	0	0	0	0	0	20	20
373	Dark Grass Blue	<i>Zizeeria karsandra</i>	0	0	20	20	0	0	0	0	0	0	20	20
374	Desert locust	<i>Schistocerca gregaria</i>	2	3	0	5	0	0	0	0	2	3	0	5
375	Dung Bug	<i>Scarabaeinae sp</i>	0	0	30	30	0	0	0	0	0	0	30	30
376	Forget-me-not	<i>Catochrysops strabo</i>	0	0	20	20	0	0	0	0	0	0	20	20
377	Giant Asian Mantis	<i>Hierodula membranacea</i>	0	0	30	30	0	0	0	0	0	0	30	30
378	Giant forest scorpion	<i>Heterometrus swammerdami</i>	0	0	30	30	0	0	0	0	0	0	30	30
379	Glassy Tiger	<i>Parantica aglea</i>	0	0	20	20	0	0	0	0	0	0	20	20
380	Gooty tarantula	<i>Poecilotheria metallica</i>	0	0	30	30	0	0	0	0	0	0	30	30
381	Gram Blue	<i>Euchrysops cnejus</i>	0	0	20	20	0	0	0	0	0	0	20	20
382	Grass Demon	<i>Udaspes folus</i>	0	0	20	20	0	0	0	0	0	0	20	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
383	Gray's leaf insect	<i>Phyllium bioculatum</i>	0	0	30	30	0	0	0	0	0	0	30	30
384	Great Eggfly	<i>Hypolimnas bolina</i>	0	0	20	20	0	0	0	0	0	0	20	20
385	Honey Bees	<i>Apis cerana indica</i>	0	0	1000	1000	0	0	0	0	0	0	1000	1000
386	Indian Cupid	<i>Orange-crowned Cupid</i>	0	0	20	20	0	0	0	0	0	0	20	20
387	Indian Jezebel	<i>Delias eucharis</i>	0	0	20	20	0	0	0	0	0	0	20	20
388	Indian Sunbeam	<i>Curetis thetis</i>	0	0	20	20	0	0	0	0	0	0	20	20
389	Indian flower mantis	<i>Creobroter pictipennis</i>	0	0	30	30	0	0	0	0	0	0	30	30
390	Indian ornamental tarantula	<i>Poecilotheria regalis</i>	0	0	30	30	0	0	0	0	0	0	30	30
391	Indian stick insect	<i>Carausius morosus</i>	0	0	30	30	0	0	0	0	0	0	30	30
392	Leaf Insect	<i>Phyllium bioculatum</i>	0	0	30	30	0	0	0	0	3	3	0	6
393	Lemon Pansy	<i>Junonia lemonias</i>	0	0	20	20	0	0	0	0	0	0	20	20
394	Lesser Grass Blue	<i>Zizina otis</i>	0	0	20	20	0	0	0	0	0	0	20	20
395	Lime Blue	<i>Chilades lajus</i>	0	0	20	20	0	0	0	0	0	0	20	20
396	Lime Butterfly	<i>Papilio demoleus</i>	0	0	20	20	0	0	0	0	0	0	20	20
397	Little Orange-tip	<i>Colotis etrida</i>	0	0	20	20	0	0	0	0	0	0	20	20
398	Little Tiger Pierrot	<i>Tarucus balkanica</i>	0	0	20	20	0	0	0	0	0	0	20	20
399	Mantis	<i>Mantis sp</i>	0	0	30	30	0	0	0	0	0	0	30	30
400	Millipedes	<i>Xenobolus carnifex</i>	0	0	30	30	0	0	0	0	0	0	30	30
401	Mottled Emigrant	<i>Catopsilia pyranthe</i>	0	0	20	20	0	0	0	0	0	0	20	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
402	Orange-spotted Grass Jewel	<i>Freyeria trochylus</i>	0	0	20	20	0	0	0	0	0	0	20	20
403	Oriental Palm Bob	<i>Suastus gremius</i>	0	0	20	20	0	0	0	0	0	0	20	20
404	Painted Grasshopper	<i>Poekilocerus pictus</i>	0	0	30	30	0	0	0	0	0	0	30	30
405	Painted Lady	<i>Vanessa cardui</i>	0	0	20	20	0	0	0	0	0	0	20	20
406	Pea Blue	<i>Lampides boeticus</i>	0	0	20	20	0	0	0	0	0	0	20	20
407	Peacock Pansy	<i>Junonia almana</i>	0	0	20	20	0	0	0	0	0	0	20	20
408	Pill millipede	<i>Arthrosphaera sp</i>	0	0	30	30	0	0	0	0	0	0	30	30
409	Pioneer	<i>Belenois aurota</i>	0	0	20	20	0	0	0	0	0	0	20	20
410	Plain Cupid	<i>Luthrodes pandava</i>	0	0	20	20	0	0	0	0	0	0	20	20
411	Plain Tiger	<i>Danaus chrysippus</i>	0	0	20	20	0	0	0	0	0	0	20	20
412	Red Helen	<i>Papilio helenus</i>	0	0	20	20	0	0	0	0	0	0	20	20
413	Red ornamental tarantula	<i>Poecilotheria rufilata</i>	0	0	30	30	0	0	0	0	0	0	30	30
414	Red scorpion	<i>Hottentotta tamulus</i>	0	0	30	30	0	0	0	0	0	0	30	30
415	Rice Swift	<i>Borbo cinnara</i>	0	0	20	20	0	0	0	0	0	0	20	20
416	Silk moth	<i>Bombyx mori</i>	0	0	30	30	0	0	0	0	0	0	30	30
417	Small Branded Swift	<i>Pelopidas mathias</i>	0	0	20	20	0	0	0	0	0	0	20	20
418	Small Cupid	<i>Chilades parrhasius</i>	0	0	20	20	0	0	0	0	0	0	20	20
419	Small Grass Yellow	<i>Eurema brigitta</i>	0	0	20	20	0	0	0	0	0	0	20	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
420	Spot Swordtail	<i>Graphium nomius</i>	0	0	20	20	0	0	0	0	0	0	20	20
421	Spotless Grass Yellow	<i>Eurema laeta</i>	0	0	20	20	0	0	0	0	0	0	20	20
422	Stick insect	<i>Carausius morosus</i>	0	0	30	30	0	0	0	0	0	0	30	30
423	Striped Pierrot	<i>Tarucus nara</i>	0	0	20	20	0	0	0	0	0	0	20	20
424	Striped Tiger	<i>Danaus genutia</i>	0	0	20	20	0	0	0	0	0	0	20	20
425	Tailed Jay	<i>Graphium agamemnon</i>	0	0	20	20	0	0	0	0	0	0	20	20
426	Tawny Coster	<i>Acraea terpsicore</i>	0	0	20	20	0	0	0	0	0	0	20	20
427	Termite	<i>Anacanthotermes viarum</i>	0	0	30	30	0	0	0	0	0	0	30	30
428	Termite	<i>Odontotermes assmuthi</i>	0	0	30	30	0	0	0	0	0	0	30	30
429	Tiny Grass Blue	<i>Zizula hylax</i>	0	0	20	20	0	0	0	0	0	0	20	20
430	Tropical house cricket	<i>Grylodes sigillatus</i>	0	0	30	30	0	0	0	0	0	0	30	30
431	Vindhyan Bob	<i>Arnetta vindhiana</i>	0	0	20	20	0	0	0	0	0	0	20	20
432	Wandering violin mantis	<i>Gongylus gongylodes</i>	0	0	30	30	0	0	0	0	0	0	30	30
433	Wasp	<i>Allorhynchium sp</i>	0	0	1000	1000	0	0	0	0	0	0	1000	1000
434	Weaver's Ants	<i>Oecophylla smaragdina</i>	0	0	1000	1000	0	0	0	0	0	0	1000	1000
435	Western Striped Albatross	<i>Appias libythea</i>	0	0	20	20	0	0	0	0	0	0	20	20
436	White Orange-tip	<i>Ixias marianne</i>	0	0	20	20	0	0	0	0	0	0	20	20
437	Yellow Orange-tip	<i>Ixias pyrene</i>	0	0	20	20	0	0	0	0	0	0	20	20
438	Yellow Pansy	<i>Junonia hierta</i>	0	0	20	20	0	0	0	0	0	0	20	20

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
439	Zebra Blue	<i>Leptotes plinius</i>	0	0	20	20	0	0	0	0	0	0	20	20
<b>Indigenous birds</b>														
440	Alexander Parakeet	<i>Palaeornis eupatria</i>	10	10	0	20	0	0	0	0	10	10	0	20
441	Bar-headed Goose	<i>Anser indicus</i>	5	5	0	10	0	0	0	0	5	5	0	10
442	Barn owl	<i>Tyto alba</i>	1	1	0	2	0	0	0	0	1	1	0	2
443	Black francolin	<i>Francolinus francolinus</i>	1	3	0	4	0	0	0	0	1	3	0	4
444	Black necked crane	<i>Grus nigricollis</i>	5	5	0	10	0	0	0	0	5	5	0	10
445	Black shouldered kite	<i>Elanus axillaris</i>	5	5	0	10	0	0	0	0	5	5	0	10
446	Cheer Pheasant	<i>Catreus wallichii</i>	1	3	0	4	0	0	0	0	1	3	0	4
447	Comb duck	<i>Sarkidiornis sylvicola</i>	5	5	0	10	0	0	0	0	5	5	0	10
448	Common Poachard	<i>Aythya ferina</i>	5	5	0	10	0	0	0	0	5	5	0	10
449	Common emerald dove	<i>Chalcophaps indica</i>	5	5	0	10	0	0	0	0	5	5	0	10
450	Common hill myna	<i>Gracula religiosa</i>	5	5	0	10	0	0	0	0	5	5	0	10
451	Common kestrel	<i>Falco tinnunculus</i>	1	1	0	2	0	0	0	0	1	1	0	2
452	Common koot	<i>Fulica atra</i>	5	5	0	10	0	0	0	0	5	5	0	10
453	Common shelduck	<i>Tadorna tadorna</i>	5	5	0	10	0	0	0	0	5	5	0	10
454	Common teal	<i>Anas crecca</i>	5	5	0	10	0	0	0	0	5	5	0	10
455	Crested serpent eagle	<i>Spilornis cheela</i>	1	1	0	2	0	0	0	0	1	1	0	2
456	Darter	<i>Anhinga melanogaster</i>	5	5	0	10	0	0	0	0	5	5	0	10
457	Eurasian Spoonbill	<i>Platalea leucorodia</i>	5	5	0	10	0	0	0	0	5	5	0	10

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
458	Eurasian eagle owl	<i>Bubo bubo</i>	1	1	0	2	0	0	0	0	1	1	0	2
459	Forest owl	<i>Athene blewitti</i>	1	1	0	2	0	0	0	0	1	1	0	2
460	Garganey	<i>Spatula querquedula</i>	5	5	0	10	0	0	0	0	5	5	0	10
461	Glossy ibis	<i>Plegadis falcinellus</i>	5	5	0	10	0	0	0	0	5	5	0	10
462	Great Indian Hornbill	<i>Buceros bicornis</i>	2	2	0	4	0	0	0	0	2	2	0	4
463	Greater Adjutant	<i>Leptoptilos dubius</i>	1	1	0	2	0	0	0	0	1	1	0	2
464	Greater Flamingo	<i>Phoenicopterus roseus</i>	15	15	0	30	0	0	0	0	15	15	0	30
465	Green imperial pigeon	<i>Ducula aenea</i>	5	5	0	10	0	0	0	0	5	5	0	10
466	Green peafowl	<i>Pavo muticus</i>	5	5	0	10	0	0	0	0	5	5	0	10
467	Grey Jungle Fowl	<i>Gallus sonneratii</i>	1	3	0	4	0	0	0	0	1	3	0	4
468	Grey Peacock pheasant	<i>Polyplectron bicalcaratum</i>	2	2	0	4	0	0	0	0	2	2	0	4
469	Grey francolin	<i>Francolinus pondicerianus</i>	1	3	0	4	0	0	0	0	1	3	0	4
470	Greyleg goose	<i>Anser anser</i>	5	5	0	10	0	0	0	0	5	5	0	10
471	Himalayan Monal	<i>Lophophorus sclateri</i>	2	2	0	4	0	0	0	0	2	2	0	4
472	Honey buzzard	<i>Pernis ptilorhynchus</i>	1	1	0	2	0	0	0	0	1	1	0	2
473	Indian Peafowl	<i>Pavo cristatus</i>	3	3	0	6	0	0	0	0	3	3	0	6
474	Indian eagle owl	<i>Bubo bengalensis</i>	1	1	0	2	0	0	0	0	1	1	0	2
475	Indian fish owl	<i>Ketupa zeylonensis</i>	1	1	0	2	0	0	0	0	1	1	0	2

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
476	Indian grey hornbill	<i>Ocyrceros birostris</i>	2	2	0	4	0	0	0	0	2	2	0	4
477	Indian hoopoe	<i>Upupa epops</i>	2	2	0	4	0	0	0	0	2	2	0	4
478	Indian scoops owl	<i>Otus bakkamoena</i>	1	1	0	2	0	0	0	0	1	1	0	2
479	Indian shikra	<i>Accipiter badius</i>	1	1	0	2	0	0	0	0	1	1	0	2
480	Indian treepie	<i>Dendrocitta vagabunda</i>	2	2	0	4	0	0	0	0	2	2	0	4
481	Kalij pheasant	<i>Lophura leucomelanos</i>	1	3	0	4	0	0	0	0	1	3	0	4
482	Large egret	<i>Ardea alba</i>	5	5	0	10	0	0	0	0	5	5	0	10
483	Lesser Adjutant	<i>Leptoptilos javanicus</i>	10	20	0	30	0	0	0	0	10	20	0	30
484	Lesser whistling duck	<i>Dendrocygna javanica</i>	5	5	0	10	0	0	0	0	5	5	0	10
485	Lesser white-fronted goose	<i>Anser erythropus</i>	5	5	0	10	0	0	0	0	5	5	0	10
486	Little Cormorant	<i>Microcarbo niger</i>	5	5	0	10	0	0	0	0	5	5	0	10
487	Little grebe	<i>Tachybaptus ruficollis</i>	5	5	0	10	0	0	0	0	5	5	0	10
488	Long billed vulture	<i>Gyps indicus</i>	5	5	0	10	0	0	0	0	5	5	0	10
489	Malabar parakeet	<i>Psittacula columboides</i>	5	5	0	10	0	0	0	0	5	5	0	10
490	Mallard	<i>Anas platyrhynchos</i>	5	5	0	10	0	0	0	0	5	5	0	10
491	Mandarin duck	<i>Aix galericulata</i>	5	5	0	10	0	0	0	0	5	5	0	10
492	Mottled owl	<i>Strix ocellata</i>	1	1	0	2	0	0	0	0	1	1	0	2
493	Mute swan	<i>Cygnus olor</i>	5	5	0	10	0	0	0	0	5	5	0	10
494	Northern Pin tail	<i>Anas acuta</i>	5	5	0	10	0	0	0	0	5	5	0	10

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
495	Open billed stork	<i>Anastomus oscitans</i>	5	5	0	10	0	0	0	0	5	5	0	10
496	Painted Stork	<i>Mycteria leucocephala</i>	5	5	0	10	0	0	0	0	5	5	0	10
497	Paradise fly catcher	<i>Terpsiphone paradisi</i>	2	2	0	4	0	0	0	0	2	2	0	4
498	Peregrine falcon	<i>Falco peregrinus</i>	1	1	9	11	0	0	0	0	1	1	9	11
499	Pheasant tailed jacana	<i>Hydrophasianus chirurgus</i>	5	5	0	10	0	0	0	0	5	5	0	10
500	Pied imperial pigeon	<i>Ducula bicolor</i>	3	7	0	10	0	0	0	0	3	7	0	10
501	Plum Headed Parakeets	<i>Psittacula cyanocephala</i>	5	5	0	10	0	0	0	0	5	5	0	10
502	Purple moorhen	<i>Porphyrio porphyrio</i>	5	5	0	10	0	0	0	0	5	5	0	10
503	Red Jungle Fowl	<i>Gallus gallus</i>	1	3	0	4	0	0	0	0	1	3	0	4
504	Ring Necked Parakeet	<i>Alexandrinus krameri</i>	12	13	0	25	0	0	0	0	12	13	0	25
505	Rosy Pelican	<i>Pelecanus onocrotalus</i>	7	8	0	15	0	0	0	0	7	8	0	15
506	Ruddy shelduck	<i>Tadorna ferruginea</i>	5	5	0	10	0	0	0	0	5	5	0	10
507	Sarus crane	<i>Grus antigone</i>	5	5	0	10	0	0	0	0	5	5	0	10
508	Shaheen falcon	<i>Falco peregrinus peregrinator</i>	1	1	0	2	0	0	0	0	1	1	0	2
509	Slender billed Vulture	<i>Gyps tenuirostris</i>	5	5	0	10	0	0	0	0	5	5	0	10
510	Spot billed pelican	<i>Pelecanus philippensis</i>	7	8	0	15	0	0	0	0	7	8	0	15
511	Spot-billed duck	<i>Anas poe-cilorhyncha</i>	5	5	0	10	0	0	0	0	5	5	0	10
512	Spotted owl	<i>Athene brama</i>	1	1	0	2	0	0	0	0	1	1	0	2
513	Vernal hanging parrot	<i>Loriculus vernalis</i>	5	5	0	10	0	0	0	0	5	5	0	10

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
514	Water hen	<i>Amaurornis phoenicurus</i>	5	5	0	10	0	0	0	0	5	5	0	10
515	White headed duck	<i>Oxyura leucocephala</i>	5	5	0	10	0	0	0	0	5	5	0	10
516	White rumped Vulture	<i>Gyps bengalensis</i>	5	5	0	10	0	0	0	0	5	5	0	10
517	White winged wood duck	<i>Asarcornis scutulata</i>	5	5	0	10	0	0	0	0	5	5	0	10
518	Woolly-necked stork	<i>Ciconia episcopus</i>	5	5	0	10	0	0	0	0	5	5	0	10
519	Yellow-footed green pigeon	<i>Treron phoenicopterus</i>	5	5	0	10	0	0	0	0	5	5	0	10
<b>Indigenous mammals</b>														
520	Asiatic Lion	<i>Panthera leo persica</i>	1	3	0	4	0	0	0	0	1	3	0	4
521	Asiatic black bear	<i>Ursus thibetanus</i>	2	2	0	4	0	0	0	0	2	2	0	4
522	Assamese Monkey	<i>Assam macaque</i>	7	7	0	14	0	0	0	0	7	7	0	14
523	Barking deer	<i>Muntiacus muntjak</i>	10	10	0	20	0	0	0	0	10	10	0	20
524	Bengal Tiger	<i>Panthera tigris tigris</i>	3	3	0	6	0	0	0	0	3	3	0	6
525	Blackbuck	<i>Antelope cervicapra</i>	10	20	0	30	0	0	0	0	10	20	0	30
526	Brown Bear	<i>Ursus arctos</i>	2	1	0	3	0	0	0	0	2	1	0	3
527	Caracal	<i>Caracal caracal</i>	1	1	0	2	0	0	0	0	1	1	0	2
528	Cheetah	<i>Acinonyx jubatus</i>	4	2	0	6	0	0	0	0	4	2	0	6
529	Chinkara	<i>Indian gazelle</i>	5	15	0	20	0	0	0	0	5	15	0	20
530	Clouded Leopard	<i>Neofelis nebulosa</i>	2	2	0	4	0	0	0	0	2	2	0	4
531	Desert fox	<i>Vulpes zerda</i>	1	1	0	2	0	0	0	0	1	1	0	2
532	Dhole Wild Dog	<i>Cuon alpinus</i>	2	2	0	4	0	0	0	0	2	2	0	4

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
533	Eurasian lynx	<i>Lynx lynx</i>	1	1	0	2	0	0	0	0	1	1	0	2
534	Fishing Cat	<i>Prionailurus viverrinus</i>	2	2	0	4	0	0	0	0	2	2	0	4
535	Four-horned antelope	<i>Tetracerus quadricornis</i>	5	15	0	20	0	0	0	0	5	15	0	20
536	Giant Squirrel	<i>Ratufa indica</i>	2	2	0	4	0	0	0	0	2	2	0	4
537	Golden Langur	<i>Trachypithecus geei</i>	4	6	0	10	0	0	0	0	4	6	0	10
538	Golden jackal	<i>Canis aureus</i>	3	3	0	6	0	0	0	0	3	3	0	6
539	Hedgehog	<i>Hemiechinus collaris</i>	2	2	0	4	0	0	0	0	2	2	0	4
540	Himalayan Goral	<i>Naemorhedus</i>	7	13	0	20	0	0	0	0	7	13	0	20
541	Himalayan Tahr	<i>Hemitragus jemlahicus</i>	7	13	0	20	0	0	0	0	7	13	0	20
542	Hog deer	<i>Axis porcinus</i>	8	12	0	20	0	0	0	0	8	12	0	20
543	Hoolock Gibbon	<i>Hoolock</i>	2	3	0	5	0	0	0	0	2	3	0	5
544	Indian Fox	<i>Vulpes bengalensis</i>	2	2	0	4	0	0	0	0	2	2	0	4
545	Indian Gaur	<i>Bos gaurus</i>	3	7	0	10	0	0	0	0	3	7	0	10
546	Indian Pangolin	<i>Manis crassicaudata</i>	10	10	0	20	0	0	0	0	10	10	0	20
547	Indian Wolf	<i>Canis lupus pallipes</i>	3	9	0	12	0	0	0	0	3	9	0	12
548	Indian flying squirrel	<i>Petaurista philippensis</i>	2	2	0	4	0	0	0	0	2	2	0	4
549	Jungle cat	<i>Felis chaus</i>	2	2	0	4	0	0	0	0	2	2	0	4
550	Leopard	<i>Panthera pardus</i>	1	1	0	2	1	1	0	2	0	0	0	0
551	Lion-tailed Macaque	<i>Macaca silenus</i>	5	13	0	18	0	0	0	0	5	13	0	18
552	Melanistic Tiger/Black Tiger	<i>Panthera tigris tigris</i>	1	1	0	2	0	0	0	0	1	1	0	2
553	Mouse Deer	<i>Tragulidae</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
554	Musk deer	<i>Moschus leucogaster</i>	2	2	0	4	0	0	0	0	2	2	0	4
555	One Horned Rhino	<i>Indian Rhino</i>	4	8	0	12	0	0	0	0	4	8	0	12
556	Pig Tailed Macaque	<i>Macaca nemestrina</i>	5	9	0	14	0	0	0	0	5	9	0	14
557	Porcupine	<i>Hystrix indica</i>	3	3	0	6	0	0	0	0	3	3	0	6
558	Pygmy Hogs	<i>Porcula salvania</i>	10	10	0	20	0	0	0	0	10	10	0	20
559	Ratel	<i>Mellivora capensis</i>	2	2	0	4	0	0	0	0	2	2	0	4
560	Red Panda	<i>Ailurus fulgens</i>	2	2	0	4	0	0	0	0	2	2	0	4
561	Rusty-spotted cat	<i>Prionailurus rubiginosus</i>	2	2	0	4	0	0	0	0	2	2	0	4
562	Sambar Deer	<i>Rusa unicolor</i>	10	20	0	30	0	0	0	0	10	20	0	30
563	Sangai deer	<i>Rucervus eldii eldii</i>	10	15	0	25	0	0	0	0	10	15	0	25
564	Slender Loris	<i>Loris tardigradus</i>	2	3	0	5	0	0	0	0	2	3	0	5
565	Sloth Bear	<i>Melursus ursinus</i>	2	2	0	4	0	0	0	0	2	2	0	4
566	Slow Loris	<i>Nycticebus bengalensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
567	Smooth Coated Otter	<i>Lutrogale perspicillata</i>	6	6	0	12	0	0	0	0	6	6	0	12
568	Snow Leopard	<i>Panthera uncia</i>	2	2	0	4	0	0	0	0	2	2	0	4
569	Spectacled Macaque	<i>Trachypithecus obscurus</i>	4	6	0	10	0	0	0	0	4	6	0	10
570	Spotted Deer	<i>Axis axis</i>	10	20	0	30	0	0	0	0	10	20	0	30
571	Striped Hyena	<i>Hyaena hyaena</i>	3	3	0	6	0	0	0	0	3	3	0	6
572	Swamp deer	<i>Rucervus duvaucelii</i>	5	15	0	20	0	0	0	0	5	15	0	20
573	Takin	<i>Budorcas taxicolor</i>	5	5	0	10	0	0	0	0	5	5	0	10

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
574	White Tiger	<i>Panthera tigris tigris</i>	1	1	0	2	0	0	0	0	1	1	0	2
575	Wild ass	<i>Equus hemionus</i>	3	9	0	12	0	0	0	0	3	9	0	12
<b>Indigenous reptiles</b>														
576	Andaman bronzeback	<i>Dendrelaphis andamanensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
577	Andaman cat snake	<i>Boiga andamanensis</i>	3	6	0	9	0	0	0	0	3	6	0	9
578	Andaman cobra	<i>Naja sagittifera</i>	3	6	0	9	0	0	0	0	3	6	0	9
579	Andaman day gecko	<i>Phelsuma andamanense</i>	3	3	0	6	0	0	0	0	3	3	0	6
580	Andaman pit viper	<i>Trimeresurus andersonii</i>	3	6	0	9	0	0	0	0	3	6	0	9
581	Aquatic forest snake	<i>Rhabdops aquaticus</i>	2	3	0	5	0	0	0	0	2	3	0	5
582	Asian box turtle	<i>Cuora amboinensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
583	Asian glass lizard	<i>Dopasia gracilis</i>	3	3	0	6	0	0	0	0	3	3	0	6
584	Bamboo Rat Snake	<i>Oreocryptophis porphyraceus</i>	4	5	0	9	0	0	0	0	4	5	0	9
585	Bamboo pit viper	<i>Trimeresurus gramineus</i>	5	5	0	10	0	0	0	0	5	5	0	10
586	Banded krait	<i>Bungarus fasciatus</i>	5	5	0	10	0	0	0	0	5	5	0	10
587	Barred wolf snake	<i>Lycodon striatus</i>	4	5	0	9	0	0	0	0	4	5	0	9
588	Bengal monitor	<i>Varanus bengalensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
589	Black softshell turtle	<i>ssonia nigricans</i>	3	3	0	6	0	0	0	0	3	3	0	6
590	Bronzeback tree snake	<i>Dendrelaphis tristis</i>	3	6	0	9	0	0	0	0	3	6	0	9

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
591	Brown forest tortoise	<i>Manouria emys</i>	3	3	0	6	0	0	0	0	3	3	0	6
592	Brown vine snake	<i>Ahaetulla pulverulenta</i>	2	3	0	5	0	0	0	0	2	3	0	5
593	Burmese python	<i>Python bivittatus</i>	2	3	0	5	0	0	0	0	2	3	0	5
594	Caspian/Black cobra	<i>Naja oxiana</i>	3	6	0	9	0	0	0	0	3	6	0	9
595	Checkered keelback	<i>Fowlea piscator</i>	3	6	0	9	0	0	0	0	3	6	0	9
596	Common Krait	<i>Bungarus caeruleus</i>	3	6	0	9	0	0	0	0	3	6	0	9
597	Common bridal snake	<i>Lycodon nympha</i>	2	3	0	5	0	0	0	0	2	3	0	5
598	Common cat snake	<i>Boiga trigonata</i>	2	3	0	5	0	0	0	0	2	3	0	5
599	Common kukri	<i>Oligodon arnensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
600	Common sand boa	<i>Eryx conicus</i>	2	3	0	5	0	0	0	0	2	3	0	5
601	Common wolf snake	<i>Lycodon capucinus</i>	3	6	0	9	0	0	0	0	3	6	0	9
602	Condaranus sand snake	<i>Psammophis condaranus</i>	2	3	0	5	0	0	0	0	2	3	0	5
603	Copper headed trinket	<i>Coelognathus radiatus</i>	3	6	0	9	0	0	0	0	3	6	0	9
604	Coral kukri	<i>Oligodon kheriensis</i>	2	3	0	5	0	0	0	0	2	3	0	5
605	Crowned river turtle	<i>Hardella thurjii</i>	3	3	0	6	0	0	0	0	3	3	0	6
606	Desert monitor	<i>Varanus griseus</i>	3	3	0	6	0	0	0	0	3	3	0	6
607	Dwarf ground lizard	<i>Calotes minor</i>	3	3	0	6	0	0	0	0	3	3	0	6
608	Eastern leopard gecko	<i>Eublepharis hardwickii</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
609	Eastern sand swimmer/Three fingered sand fish	<i>Ophion</i>	3	3	0	6	0	0	0	0	3	3	0	6
610	Elongated tortoise	<i>Indotestudo elongata</i>	3	3	0	6	0	0	0	0	3	3	0	6
611	Flapshell turtle	<i>Lissemys punctata</i>	2	4	0	6	0	0	0	0	2	4	0	6
612	Forsten's cat snake	<i>Boiga forsteni</i>	3	6	0	9	0	0	0	0	3	6	0	9
613	Gharial	<i>Gavialis gangeticus</i>	5	5	0	10	0	0	0	0	5	5	0	10
614	Giri's geckoella	<i>Cyrtodactylus varadgirii</i>	3	3	0	6	0	0	0	0	3	3	0	6
615	Golden gecko	<i>Calodactylodes aureus</i>	3	3	0	6	0	0	0	0	3	3	0	6
616	Green bronzeback	<i>Dendrelaphis andamanensis</i>	3	6	0	9	0	0	0	0	3	6	0	9
617	Green cat snake	<i>Boiga cyanea</i>	3	6	0	9	0	0	0	0	3	6	0	9
618	Green keelback	<i>Rhabdophis plumbicolor</i>	3	6	0	9	0	0	0	0	3	6	0	9
619	Green vine snake	<i>Ahaetulla prasina</i>	3	6	0	9	0	0	0	0	3	6	0	9
620	Gujarat Racer	<i>Wallaceophis gujaratensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
621	Gujarat house gecko	<i>Hemidactylus gujaratensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
622	Humpnosed pit viper	<i>Hypnale hypnale</i>	3	6	0	9	0	0	0	0	3	6	0	9
623	Impressed tortoise	<i>Manouria impressa</i>	3	3	0	6	0	0	0	0	3	3	0	6
624	Indian chameleon	<i>Chamaeleo zeylanicus</i>	3	3	0	6	0	0	0	0	3	3	0	6
625	Indian egg eater	<i>Elachistodon westermanni</i>	3	6	0	9	0	0	0	0	3	6	0	9

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
626	Indian eyed turtle	<i>Morenia petersi</i>	3	3	0	6	0	0	0	0	3	3	0	6
627	Indian fringe toed lizard	<i>Acanthodactylus cantoris</i>	3	3	0	6	0	0	0	0	3	3	0	6
628	Indian python	<i>Python molurus</i>	10	10	0	20	0	0	0	0	10	10	0	20
629	Indian smooth snake	<i>Coronella brachyura</i>	3	6	0	9	0	0	0	0	3	6	0	9
630	Indian softshell turtle	<i>ssonia gangetica</i>	3	3	0	6	0	0	0	0	3	3	0	6
631	Keeled mabuya skink	<i>Eutropis carinata</i>	3	3	0	6	0	0	0	0	3	3	0	6
632	King Cobra	<i>Ophiophagus hannah</i>	2	4	0	6	0	0	0	0	2	4	0	6
633	Kutch snake-eye lizard	<i>Ophisops kutchensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
634	Large eyed bronzeback	<i>Dendrelaphis grandoculis</i>	2	3	0	5	0	0	0	0	2	3	0	5
635	Large scaled pitviper	<i>Trimeresurus macrolepis</i>	3	6	0	9	0	0	0	0	3	6	0	9
636	Large scaled pitviper	<i>Trimeresurus macrolepis</i>	2	3	0	5	0	0	0	0	2	3	0	5
637	Leith's sand snake	<i>Psammophis leithii</i>	3	6	0	9	0	0	0	0	3	3	0	6
638	Leopard gecko	<i>Eublepharis macularius</i>	3	3	0	6	0	0	0	0	10	20	0	30
639	Malabar pit viper	<i>Trimeresurus malabaricus</i>	3	6	0	9	0	0	0	0	3	6	0	9
640	Mock viper	<i>Psammodynastes pulverulentus</i>	2	3	0	5	0	0	0	0	2	3	0	5
641	Monocled cobra	<i>Naja kaouthia</i>	3	9	0	12	0	0	0	0	3	9	0	12
642	Mugger	<i>Crocodylus</i>	3	3	0	6	0	0	0	0	3	3	0	6
643	Northern river terrapin	<i>Batagur baska</i>	3	3	0	6	0	0	0	0	3	3	0	6
644	Olive forest snake	<i>Rhabdops olivaceus</i>	2	3	0	5	0	0	0	0	2	3	0	5

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
645	Olive keelback	<i>Atretium schistosum</i>	3	6	0	9	0	0	0	0	3	6	0	9
646	Ornate day gecko	<i>Cnemaspis ornata</i>	3	3	0	6	0	0	0	0	3	3	0	6
647	Ornate flying snake	<i>Chrysopelea ornata</i>	3	6	0	9	0	0	0	0	3	6	0	9
648	Peacock softshell turtle	<i>ssonia hurum</i>	3	3	0	6	0	0	0	0	3	3	0	6
649	Persian dwarf gecko	<i>Microgecko persicus</i>	3	3	0	6	0	0	0	0	3	3	0	6
650	Poona mole skink	<i>Eurylepis poonaensis</i>	3	3	0	6	0	0	0	0	3	3	0	6
651	Rat snake	<i>Ptyas mucosa</i>	3	6	0	9	0	0	0	0	3	6	0	9
652	Red crowned roof turtle	<i>Batagur kachuga</i>	3	3	0	6	0	0	0	0	3	3	0	6
653	Red necked keelback	<i>Rhabopis subminiatus</i>	2	3	0	5	0	0	0	0	2	3	0	5
654	Red sand boa	<i>Eryx johnii</i>	3	6	0	9	0	0	0	0	3	6	0	9
655	Red tailed trinket snake	<i>Gonyosoma oxycephalum</i>	2	3	0	5	0	0	0	0	2	3	0	5
656	Reticulated Python	<i>Malayopython reticulatus</i>	3	3	0	6	0	0	0	0	3	3	0	6
657	Royal Snake	<i>Spalerosophis diadema</i>	3	6	0	9	0	0	0	0	3	6	0	9
658	Russell's viper	<i>Daboia russelii</i>	3	6	0	9	0	0	0	0	3	6	0	9
659	Saltwater crocodile	<i>Crocodylus porosus</i>	2	3	0	5	0	0	0	0	2	3	0	5
660	Saw-scaled viper	<i>Echis carinatus</i>	3	6	0	9	0	0	0	0	3	6	0	9
661	Scaly gecko	<i>Hemidactylus scabriceps</i>	3	3	0	6	0	0	0	0	3	3	0	6
662	Sind long headed snake	<i>Lytorhynchus paradoxus</i>	2	3	0	5	0	0	0	0	2	3	0	5
663	Sind sand gecko	<i>Crossobammon orientalis</i>	3	3	0	6	0	0	0	0	3	3	0	6

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (continued)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
664	Sochurek's sawscaled viper	<i>Echis sochureki</i>	2	3	0	5	0	0	0	0	2	3	0	5
665	Spectacled cobra	<i>Naja naja</i>	3	6	0	9	0	0	0	0	3	6	0	9
666	Spiny Tailed Lizard	<i>Saara hardwickii</i>	3	3	0	6	0	0	0	0	3	3	0	6
667	Spotted pond turtle	<i>Geoclemys hamiltonii</i>	3	3	0	6	0	0	0	0	3	3	0	6
668	Spotted supple skink	<i>Riopa albopunctata</i>	3	3	0	6	0	0	0	0	3	3	0	6
669	Star tortoise	<i>Geochelone elegans</i>	3	3	0	6	0	0	0	0	3	3	0	6
670	Stout sand snake	<i>Psammophis longifrons</i>	3	6	0	9	0	0	0	0	3	6	0	9
671	Striped keelback	<i>Amphiesma stolatum</i>	3	6	0	9	0	0	0	0	3	6	0	9
672	Three striped roof turtle	<i>Batagur dhongoka</i>	3	3	0	6	0	0	0	0	3	3	0	6
673	Tokay gecko	<i>Gekko gekko</i>	6	6	0	12	0	0	0	0	6	6	0	12
674	Travancore tortoise	<i>Indotestudo travancorica</i>	3	3	0	6	0	0	0	0	3	3	0	6
675	Tricarinate hill tortoise	<i>Melanochelys tricarinata</i>	3	3	0	6	0	0	0	0	3	3	0	6
676	Trinket snake	<i>Coelognathus helena</i>	3	6	0	9	0	0	0	0	3	6	0	9
677	Variable vine snake	<i>Ahaetulla anomala</i>	2	3	0	5	0	0	0	0	2	3	0	5
678	Vizag limbless skink	<i>Barkudia melanosticta</i>	3	3	0	6	0	0	0	0	3	3	0	6
679	Wall's Krait	<i>Bungarus sindanus</i>	3	6	0	9	0	0	0	0	3	6	0	9
680	Water monitor	<i>Varanus salvator</i>	3	3	0	6	0	0	0	0	3	3	0	6
681	Western leopard gecko	<i>Eublepharis fuscus</i>	3	3	0	6	0	0	0	0	3	3	0	6
682	Whitaker's boa	<i>Eryx whitakeri</i>	3	6	0	9	0	0	0	0	3	6	0	9

Table 4.1: Proposed Animal Collection Plan of Zoological Park of Greens Zoological Rescue and Rehabilitation Centre (01.09.2023) (*continued*)

Sl	Common Name	Scientific Name	Proposed				Current				To be Acquired			
			M	F	U	T	M	F	U	T	M	F	U	T
683	Yellow monitor	<i>Varanus flavescens</i>	3	3	0	6	0	0	0	0	3	3	0	6
684	Yellow spotted wolf snake	<i>Lycodon flavomaculatus</i>	2	3	0	5	0	0	0	0	2	3	0	5
685	giri forest lizard	<i>Calotes nemoricola</i>	3	3	0	6	0	0	0	0	3	3	0	6

## Carrying Capacity of Facilities at Greens Zoological Rescue and Rehabilitation Centre

Table 4.2: Carrying Capacity of Greens Zoological, Rescue and Rehabilitation Centre Facilities

Sl	Facility	Objective	Area in acres	Category	Number of enclosures	Average size of enclosures (sqm)	Total Number of retiring cells	Average size of retiring cells	number of kraals	Carrying Capacity	Current Stock	Existing Capacity	Existing Stock	Remaining Capacity	Area per animal
<b>Quarantine Zone</b>															
1	Animal Quarantine	Quarantine	9.0	Large-carnivore	140	47.5	140	16.7	0	144	36	108	108	36	46.2
2	Animal Quarantine	Quarantine	0.0	Small-carnivore	18	15.0	18	7.3	0	36	19	17	36	0	7.5
3	Animal Quarantine	Quarantine	0.0	Large-herbivore	4	107.0	4	66.0	0	8	0	8	3	5	53.5
4	Animal Quarantine	Quarantine	0.0	Medium- & Small primate	4	47.5	4	16.7	0	50	0	50	50	0	3.8
5	Animal Quarantine	Quarantine	0.0	Lizards	50	40.0	0	0.0	0	1500	1271	229	1315	185	1.3
6	Animal Quarantine	Quarantine	0.0	small-snakes	30	40.0	0	0.0	0	200	35	165	200	0	6.0
7	Animal Quarantine	Quarantine	0.0	Turtles & Tortoises	20	80.0	0	0.0	0	1200	385	815	385	815	1.3
8	Animal Quarantine	Quarantine	0.0	Birds	4	94.0	4	0.0	0	16	7	9	7	9	23.5
9	Animal Quarantine	Quarantine	0.0	Herbivores*	0	0.0	0	0.0	0	600	162	438	87	513	0.0
10	Animal Quarantine	Quarantine	0.0	Invertebrates & Molluscs	0	0.0	0	0.0	0	4000	953	3047	953	3047	0.0
<b>Rescue and Rehabilitation Centre</b>															
11	Satellite Rescue Centre for Leopards	Rescue and lifetime care (Off-exhibit)	9.0	Medium-carnivore	14	550.0	36	40.0	0	72	57	21	57	15	106.9
12	Extension I of Satellite Rescue Centre- Leopards	Rescue and lifetime care (Off-exhibit)	5.0	Medium-carnivore	8	1100.0	40	14.0	8	80	86	80	80	0	110.0

Table 4.2: Carrying Capacity of Greens Zoological, Rescue and Rehabilitation Centre Facilities (*continued*)

SI	Facility	Objective	Area in acres	Category	Number of enclosures	Average size of enclosures (sqm)	Total Number of retiring cells	Average size of retiring cells	number of kraals	Carrying Capacity	Current Stock	Existing Capacity	Existing Stock	Remaining Capacity	Area per animal
13	Extension II of Satellite Rescue Centre for Leopards	Rescue and lifetime care (Off-exhibit)	10.0	Medium-carnivore	51	800.0	102	40.0	4	204	98	106	106	98	200.0
14	Extension III of Satellite Rescue Centre (Reptiles, Bear and Macaques)	Rescue and lifetime care (Off-exhibit)	13.0	Large-carnivore	2	1300.0	22	13.0	4	44	36	8	36	8	59.1
15	Extension III of Satellite Rescue Centre (Reptiles, Bear and Macaques)	Rescue and lifetime care (Off-exhibit)	0.0	small-snakes	8	40.0	0	0.0	0	200	31	169	178	22	1.6
16	Extension III of Satellite Rescue Centre (Reptiles, Bear and Macaques)	Rescue and lifetime care (Off-exhibit)	0.0	Small-carnivore	7	530.0	36	5.0	7	100	12	88	41	59	37.1
17	Extension III of Satellite Rescue Centre (Reptiles, Bear and Macaques)	Rescue and lifetime care (Off-exhibit)	0.0	Crocodylians	19	0.0	0	0.0	0	1248	959	289	1022	226	50.0
18	Extension III of Satellite Rescue Centre (Reptiles, Bear and Macaques)	Rescue and lifetime care (Off-exhibit)	0.0	Large-snakes	20	120.0	0	0.0	0	50	108	132	210	-160	48.0
19	Extension III of Satellite Rescue Centre (Reptiles, Bear and Macaques)	Rescue and lifetime care (Off-exhibit)	0.0	Turtles & Tortoises	12	0.0	0	0.0	0	600	380	220	542	58	2.4
20	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	72.8	Large-carnivore	23	1100.0	86	21.8	23	258	166	92	114	144	98.1
21	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	0.0	Medium-carnivore	40	550.0	120	21.8	34	180	50	310	160	20	122.2
22	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	0.0	Small-carnivore	8	65.0	8	9.0	0	32	10	22	19	13	16.2
23	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	0.0	Medium herbivore-okapi	1	1650.0	3	0.0	0	20	5	15	5	15	82.5
24	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	0.0	Medium- & Small primate	4	550.0	8	0.0	0	48	15	33	15	33	45.8
25	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	0.0	Large-snakes	3	156.0	0	0.0	0	115	8	107	74	41	4.1
26	Rescue and Rehabilitation Centre	Rescue and lifetime care (Off-exhibit)	0.0	Birds	3	300.0	0	0.0	0	62	19	43	32	30	14.5
27	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	54.0	Birds	1	490.0	0	0.0	0	33	0	33	33	0	14.8
28	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Large-carnivore	8	491.0	16	8.0	0	16	16	0	16	0	245.5
29	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Large-herbivore	3	2222.0	4	127.5	0	18	11	7	10	8	370.3
30	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Large-primate	16	1068.8	40	12.3	4	120	18	102	34	86	142.5
31	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Medium-anteater	15	61.4	30	8.0	0	75	11	64	17	58	12.3
32	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Small-carnivore	45	66.9	90	10.9	0	90	55	125	30	60	33.4
33	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Medium-herbivore	19	1791.4	0	0.0	0	570	427	143	500	70	59.7
34	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Medium- & Small primate	17	556.3	88	9.0	0	528	200	328	478	50	17.9
35	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Medium- & Small primate	2	62.0	4	8.0	0	4	3	1	3	1	31.0
36	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Small-carnivore	18	85.1	36	20.1	0	144	41	103	140	4	10.6

Table 4.2: Carrying Capacity of Greens Zoological, Rescue and Rehabilitation Centre Facilities (*continued*)

SI	Facility	Objective	Area in acres	Category	Number of enclosures	Average size of enclosures (sqm)	Total Number of retiring cells	Average size of retiring cells	number of kraals	Carrying Capacity	Current Stock	Existing Capacity	Existing Stock	Remaining Capacity	Area per animal
37	Rescue Centre for Exotic Animals (II)	Rescue and lifetime care (Off-exhibit)	0.0	Small-mammal	7	82.0	14	4.0	0	70	34	36	45	25	8.2
38	Rescue and Conservation Centre for African Rhinoceros	Rescue and lifetime care (Off-exhibit)	39.7	Large-herbivore	1	160000.0	20	0.0	20	118	0	118	5	113	1355.9
39	Bear Care Centre	Rescue and lifetime care (Off-exhibit)	10.0	Large-carnivore	19	1500.0	45	14.0	0	106	0	106	68	38	268.9
40	Rescue Centre for Herbivores	Rescue and lifetime care (Off-exhibit)	26.0	Medium-herbivore	4	20234.0	0	0.0	16	400	0	400	387	13	202.3
41	Rescue Centre for Exotic Animals (I)	Rescue and lifetime care (Off-exhibit)	50.0	Large-herbivore	1	20000.0	0	0.0	0	50	0	50	23	27	400.0
42	Rescue Centre for Exotic Animals (I)	Rescue and lifetime care (Off-exhibit)	0.0	Medium-herbivore	3	30733.3	0	0.0	0	696	0	696	190	506	132.5
43	Rescue Centre for Exotic Animals (I)	Rescue and lifetime care (Off-exhibit)	0.0	Small-mammal	2	8250.0	0	0.0	0	159	0	159	0	159	103.8
44	Rescue Centre for Exotic Animals (I)	Rescue and lifetime care (Off-exhibit)	0.0	Medium- & Small primate	1	2800.0	25	3.0	0	25	0	25	25	0	112.0
45	Rescue Centre for Exotic Animals (I)	Rescue and lifetime care (Off-exhibit)	0.0	Birds	1	1350.0	0	0.0	0	68	0	68	0	68	19.9
<b>Conservation Breeding Centres</b>															
46	Avian Conservation Breeding Centre	Conservation & Research	10.0	small-birds	129	42.0	129	6.7	0	258	38	220	38	220	21.0
47	Conservation Breeding Centre for One-horned Rhinoceros	Conservation & Research	6.3	Large-herbivore	2	26600.0	0	0.0	0	30	3	27	5	25	1773.3
48	Cheetah Conservation Centre	Conservation & Research	3.2	Medium-carnivore	6	1700.0	14	10.0	0	56	24	32	43	13	182.1
49	Conservation Breeding Centre for Indian species	Conservation & Research	10.0	Vulture	11	159.6	0	0.0	0	60	0	78	12	48	29.3
50	Cheetah Conservation and Research Centre (II)	Conservation & Research	20.0	Medium-carnivore	50	1000.0	100	10.0	0	200	0	200	36	164	250.0
0	Extension of Cheetah Rescue Centre	Satellite Rescue Centre	45.0	Medium-carnivore	40	1000.0	100	10.0	40	300	0	200	0	300	133.3
51	Large Cats Conservation Breeding Centre	Conservation & Research	20.0	Large-carnivore	80	1000.0	320	10.0	80	160	0	0	0	160	500.0
52	Asiatic Lion Care, Medical Research and Hospital	Conservation & Research	49.5	Large-carnivore	4	3000.0	52	10.0	56	52	0	52	41	11	230.8
<b>Zoological Park</b>															
53	Zoological Park	Exhibit for public display	196.7	NA	650	0.0	0	0.0	0	7764	2	7762	0	7764	0.0
<b>Satellite Rescue Centres</b>															
54	Satellite Rescue Centre	Satellite Rescue Centre	23.0	Medium-carnivore	20	1000.0	100	10.0	20	200	0	200	0	200	100.0
55	Satellite Rescue Centre	Satellite Rescue Centre	0.0	Small-carnivore	40	500.0	80	10.0	40	500	0	500	0	500	40.0
56	Satellite Rescue Centre for Reptiles	Satellite Rescue Centre	3.0	small-snakes	200	40.0	0	0.0	0	1000	0	1000	0	1000	8.0
0	Total	NA	685.1	NA	1908	297167.7	1938	572.8	356	24937	5791	19456	8014	16923	0.0

## **Description of the Master Layout Plan of the Greens Zoological, Rescue and Rehabilitation Centre**

The GZRRC Master layout plan is designed to depict flora and fauna representative of the biogeographic zones of the world. A Master Layout Plan of the proposed Greens Zoological, Rescue and Rehabilitation Centre is attached at Annexure I. The colour code on the map is as per the guidelines and norms of CZA for submitting the layout. In the following section, we provide a brief overview of the design principles guiding the layout of GZRRC.

### **Themes of Display**

GZRRC is designed to represent the earth's major biomes. The layout plan aims to showcase the unique habitats characteristic of these biomes. Animals will be exhibited in naturalistic created niche-specific enclosure that mimic their natural habitats. Nine Major biomes represented at GZRRC are described below:

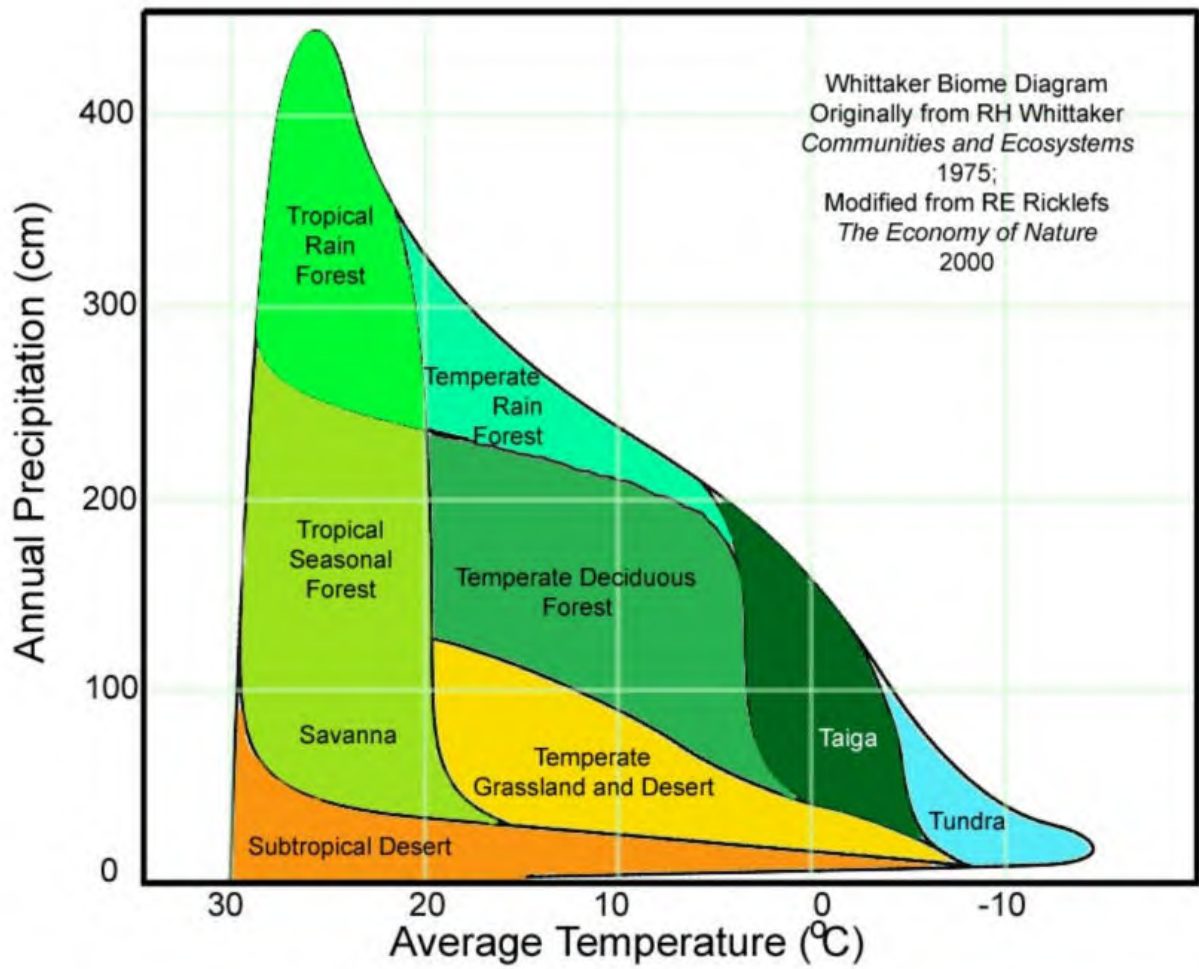


Figure 4.3: Whittaker Biome Diagram; Source: Wikimedia Commons, adapted from *Communities and Ecosystems* 1975.

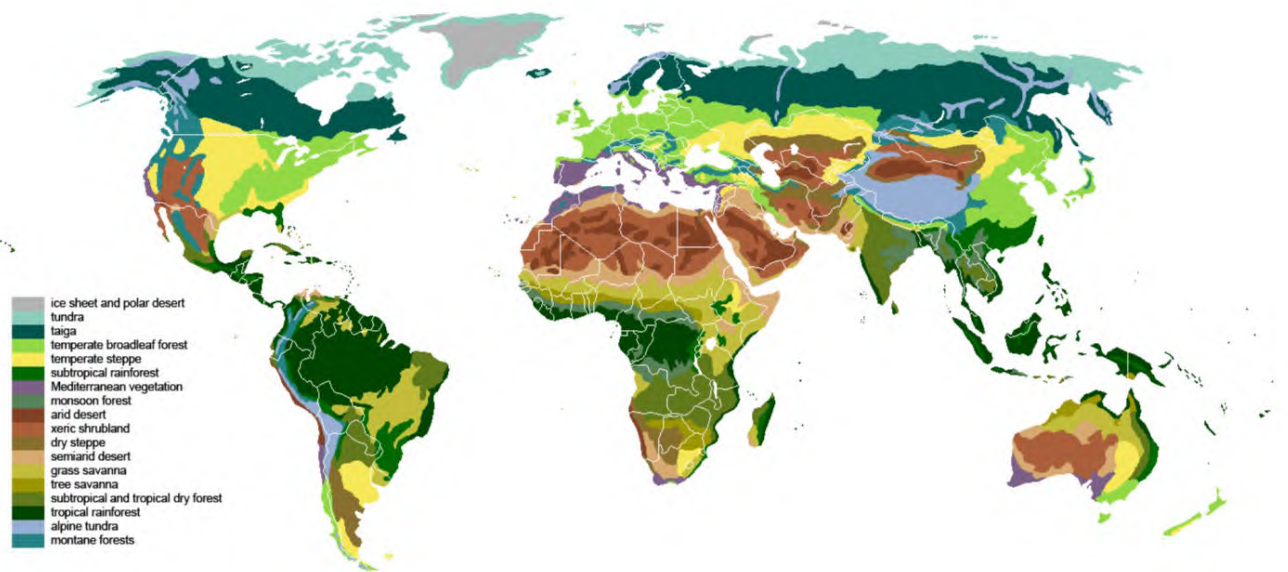


Figure 4.4: Terrestrial biomes around the world; Source: P Wikimedia Commons, adapted from Olson DM. et al, 2001 (Terrestrial Ecoregions of the World: A New Map of Life on Earth. BioScience 51 (11), 2001: 933-938).

1. **Coastal Biome** - Rocky Coasts (Africa, North America & South America).
2. **Desert Biome** - Kalahari Rock Fields (Africa) & Thar Dunes (Asia).
3. **Dry forest**- Mada Spiny (Africa), Sasan Gir Bushland (Asia) & Gran Chaco Plains (South America).
4. **Temperate Forest** - Neora Valley (Asia) & Eurasian Woodlands (Europe).
5. **Aquatic**(Fresh Water) - Ganga Wetlands (Asia).
6. **Jungle** - Congo Basin (Africa), Bandipur Woods (South Asia), Sumatra Islands (Australasia) & Amazon Delta (South America).
7. **Grassland**- Great Savanna (Africa) & Kaziranga Grasslands (Asia).
8. **Steppe** - Mongolian Steppe (Asia) & Australian Outback (Australia).
9. **Tundra** – Arctic centre (Arctic & Antarctica), Himalayan Highlands (Asia) & Yukon Creek (North America).

## Hierarchy of Life on Earth

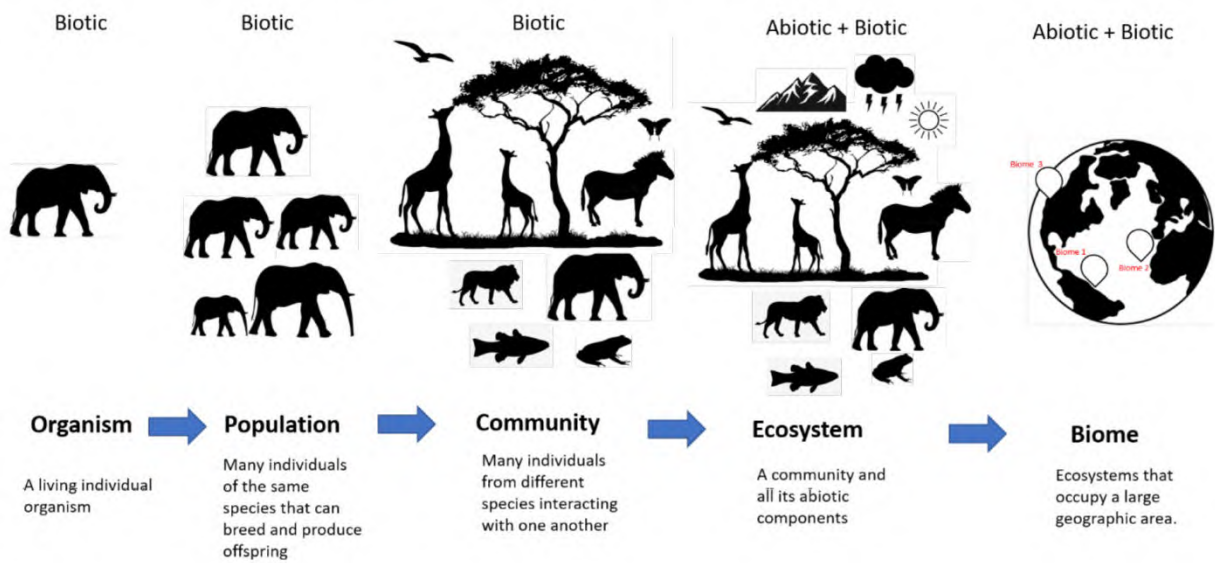


Figure 4.5: Hierarchy of life on earth

## Coastal Biome - Rocky Coasts (Africa, South America and North America):

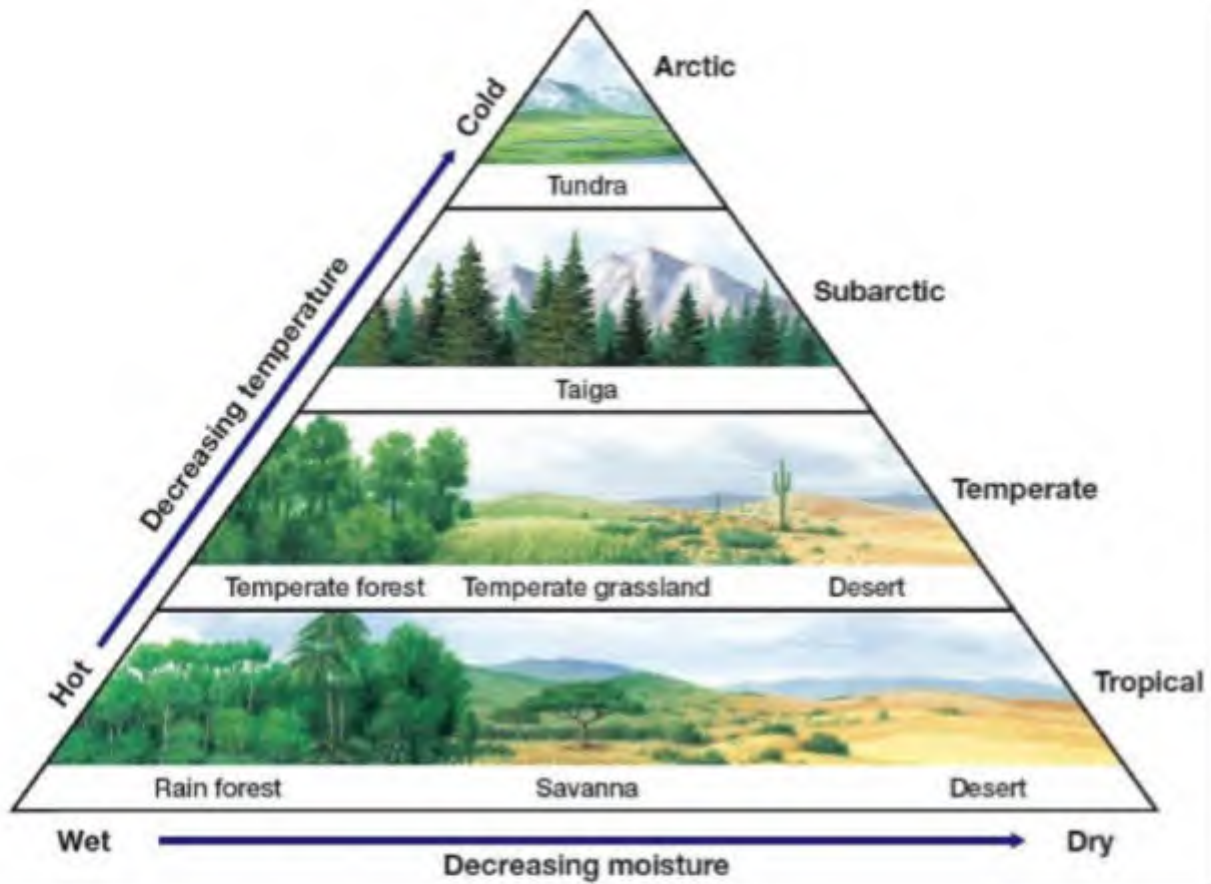


Figure 4.6: Different biomes in relation to temperature and moisture. Source - <http://anamelissa-scienceclass.blogspot.com/2010/11/summary6-world-biomes.html>

The Rocky Coasts zone represents the Coastal biome at GZRRC. Coastal biome is a fragile ecosystem encompassing diverse subsystems ranging from onshore to offshore. These are littoral or inter-tidal, neritic and oceanic; from the sea surface to the bottom (pelagic and benthic). The dynamic and diverse oceanographic conditions and physical environment of the coast support a vast array of marine animals. Sea level rise and severe weather events due to climate change poses a new, serious threat to coastal habitats already impacted by human activities and populations focused along the coast. The future of coastal habitats is dependent on the decisions we make today about how we will mitigate and adapt to rising sea levels and manage coastal resources. The West coast of South America is more than 3000 km long and in terms of marine biological resources supports diverse marine ecosystems from tropical coral reefs to the Humboldt current large marine ecosystem, an upwelling of cold water from the depths of the Pacific Ocean which brings many nutrients to the surface. It is one of the most productive regions for marine life, yet one of the most overly harvested regions too. The Humboldt

penguin (*Spheniscus humboldti*) that shares its name with the chilly Humboldt current is only found along this coast line and faces an uncertain future brought about by anthropogenic hazards and the *El-Nino* weather patterns that imperil the species in the wild.

The South American sea lion (*Otaria bryonia*) is distributed throughout most of South American coast and an apex predator of the coastal biome of South America. The species in the zoo will be a representative of the coastal biome of South American and will act as a conservation ambassador of the region. The California coastal region is the richest and endangered temperate marine communities of North America. With such great pressure on the coast line, it's challenging to find the balance between meeting the needs of people and conserving these ecosystems and the many species that depend on them, including humans. One of the most effected and key stone marine species of the region is the California sea lion (*Zalophus californianus*). They help to maintain balanced food webs in the marine ecosystems. These sea lions are cognitively complex marine mammals that represent a valuable addition to conserve the unique California's coast and secondly educating visitors about the threats posed by the uncontrolled harvesting of marine life. The west coast of South Africa and Namibia is one of the most productive ecosystems of the Atlantic Ocean. With more than a third of the region's population living along the coast, the marine and coastal environment is under pressure from a multitude of threats that seriously affect its health and the populations that depend on it. African penguins (*Spheniscus demersus*) is a keystone species in the marine ecosystem of South Africa. African penguins are endangered due to over-fishing, oil spills, and climate change. They are an essential part of the food chain on the African coastline and their extinction would mean collapse of marine communities. The species would be a representative species of African coastal marine community and as a part of global conservation efforts.

### **Desert Biome:-Kalahari Rock Fields (Africa) & Thar Dunes (Asia)**

One-fifth of the Earth's surface is covered in dry habitats that receive less than 30cms of rain per year on average. Deserts are hot, dry places made up mostly of sand, rock, and mountains. In general, deserts are defined as areas where the amount of water that evaporates in the air is greater than the amount that falls to the ground as rain. Examples of deserts in Africa and Asia are the Namibian and Kalahari deserts, and the Arabian and Thar deserts in Asia respectively. Often thought of as barren wastelands, deserts are rich ecosystems teeming with biodiversity. Desert animals have developed unique ways to use sporadic, unpredictable rainfall to their advantage. Despite the adaptability of its flora and fauna, this fragile ecosystem can easily be thrown off balance. Grasslands and deserts are the most neglected ecosystems world-wide. The magnificent landscape is threatened by an ever-increasing human population, water misuse and mismanagement, overgrazing by cattle and goats, and a lack of knowledge regarding the desert's ecological importance. One of the main objectives of having species from desert ecosystem in the current collection is for fostering an awareness to the public about worldwide desert ecosystems in general and their unique animals with special adaptations to conserve water and building insurance populations of desert animals threatened with extinction.

### **Kalahari Rock Fields:**

From the African continent, the species will represent Kalahari Desert fauna. The African cheetah (*Acinonyx jubatus*) along with the Addax (*Addax nasomaculatus*), Scimitar oryx (*Oryx dammah*), Somali wild ass (*Equus africanus somaliensis*) and Dama gazelle (*Nanger dama*) are one of the important keystone species along with Desert fox (*Vulpes zerda*) and Barbary sheep (*Ammotragus lervia*) are represented in the collection plan. Many of these species are threatened with extinction and *ex-situ* conservation of these species is vital to their long-term future on earth.

All the species will act as education ambassadors of species from the region as well as for captive breeding efforts to increase the number of these species.

### **Thar Dunes:**

The Thar desert is one of the smallest deserts in the world, but it exhibits a wide variety of habitats and biodiversity. It is the most thickly populated deserts in the world. Biogeographically It is considered an important desert in terms of its location where Palearctic, Oriental and Saharan elements of biodiversity are found. Despite its area, the Thar Desert has a high avian and mammalian diversity, from its location on the crossroads of the Palearctic and Oriental biogeographic regions. The Thar desert along with Kutch of Gujarat is the major habitat for many key stone species like Indian wolf (*Canis lupus pallipes*), Indian wild ass (*Equus hemionus*), Chinkara (*Gazella bennettii*) and Caracal (*Caracal caracal*). These are represented in the current collection plan along with Greater flamingo (*Phoenicopterus roseus*), Bengal monitor (*Varanus bengalensis*) and Golden jackal (*Canis aureus*). They will represent the broad faunal assemblage of Thar desert in general at the zoo for educating the public and as an assurance population for conservation of these species. The Arabian deserts will be represented by the Arabian oryx (*Oryx leucoryx*). This species represents a success story of a species that went extinct in the wild and thereafter reintroduced into the wild due to *ex-situ* conservation of the species in the zoo. This will spread the message of the importance of zoos in conservation of species worldwide to public.

### **Dry forest:**

Mada Spiny (Africa), Sasan Gir Bushland (Asia) & Gran Chaco Plains (South America)

Dry forests account for nearly half of the world's tropical and subtropical forests spanning large areas of Africa, Latin America and Asia. Dry forests receive far less attention than rainforests but harbour high levels of biodiversity and are imperiled by multiple anthropogenic factors mainly due to agriculture and global climate change. Tropical dry forests are at even greater risk of disappearing than humid forests, primarily due to higher population densities and the associated demand for energy and land. Almost half of dry forests have been lost globally and less than 10% are protected.

### **Mada Spiny:**

The Madagascar dry deciduous forests represent a tropical dry forest ecoregion situated in the western and northern part of Madagascar. The region is a biodiversity hotspot with high endemism where 80 to 90 per cent of its animal and plant species are exclusive to the area. The region has suffered large-scale clearance for agriculture. The flagship taxa of the Madagascar Dry Deciduous Forests ecoregion are the endangered varieties of lemurs. In the current proposed collection three species of lemurs that include Ring tailed lemur (*Lemur catta*), Black ruffed lemur (*Varecia variegata*), Red ruffed lemur (*Varecia rubra*) and Fossa (*Cryptoprocta ferox*).

### **Sasan Gir Bushland:**

Tropical dry broad leaf forest eco-region is one of the most widely distributed biomes in South Asia occupying almost most of the hinterland of the region. The region is further divided into few sub regions constituting the Deccan region, Choota Nagpur region, East Coast deccan region, Saurashtra, Narmada valley, etc., mainly characterized based on the floral composition. Most of these regions are affected mainly due to heavy deforestation and mining. It is home to a very broad assemblage of mammalian and bird fauna of the region. Many threatened species are included in the collection plan. They include the endangered Forest owl (*Athene blewitti*), Indian fish owl (*Ketupa zeylonensis*), Indian scops owl (*Otus bakkamoena*), Mottled owl (*Strix ocellate*) Indian shikra (*Accipiter badius*), White backed Vulture (*Gyps bengalensis*), Indian hoopoe (*Upupa epops*), Grey francolin (*Francolinus pondicerianus*) and Shaheen falcon (*Falco peregrinus peregrinator*) among birds. Among mammals, Asiatic lion (*Panthera leo persica*), Dhole (*Cuon alpinus*), Striped hyena (*Hyaena hyaena*), Indian fox (*Vulpes bengalensis*) and Four-horned antelope (*Tetracerus quadricornis*) are included. Among reptiles, Mugger (*Crocodylus palustris*) represents the broad leaf forest eco-region of South Asia.

### **Gran Chaco Plains:**

The dry forest biome of South America constitutes the tropical and subtropical dry broad leaf forests spread across South American. Among other habitats in the new world, this region tends to be highly threated due to higher population densities and the associated demand for energy and land. The faunal representation from the region constitutes Jaguar (*Panthera onca*), Maned wolf (*Chrysocyon brachyurus*), Jaguarundi (*Herpailurus yagouaroundi*), Margay (*Leopardus wiedii*), Ocelot (*Leopardus pardalis*), Guanaco (*Lama guanicoe*), American tapir (*Tapirus terrestris*), Northern tamandua (*Tamandua mexicana*), Mexican hairy dwarf porcupine (*Sphiggurus mexicanus*), Howler monkey (*Alouatta sp.*), Squirrel monkey (*Saimiri sp.*), White faced capuchin (*Cebus imitator*), Weeper capuchin (*Cebus olivaceous*), Tufted capuchin (*Cebus apella*), Emperor marmoset (*Callithrix jacchus*), Coatimundi (*Nasua nasua*), Bush dog (*Speothos venaticus*) and Patagonian mara (*Dolichotis patagonum*) that are represented in the current collection plan. While most of the species have distribution in central and northern region of South America, Guanaco (*Lama guanicoe*), Giant South American anteater (*Myrmecophaga tridactyla*) and Patagonian mara (*Dolichotis patagonum*) are distributed further south.

## Temperate Forest

Neora Valley (Asia) & Eurasian Woodlands (Europe):

In general, Temperate forest biome is second most widely distributed terrestrial biome that is dominated by plant life, along with the biotic communities that inhabit them. Temperate forest are found in between 25° and 50° latitude in both hemispheres and cover a considerable portion of the earth's terrestrial area. The forest is dominated by conifers and broad-leafed tree species which experience a broad temperature gradients across seasons.

### Neora Valley:

This forest type is situated between the 500 m to 2000 m altitude in South Asia. The region constitutes broad leaf tree species that live in moist habitats. The species of the region that is represented in the current collection are Red panda (*Ailurus fulgens*), Asiatic black bear (*Ursus thibetanus*), Barking deer (*Muntiacus muntjac*), Himalayan goral (*Naemorhedus goral*), Himalayan tahr (*Hemitragus jemlahicus*), Takin (*Budorcas taxicolor*), Indian flying squirrel (*Petaurista philippensis*), Sambar deer (*Rusa unicolor*), Spotted deer (*Axis axis*), Sloth bear (*Melursus ursinus*) and Indian gaur (*Bos gaurus*). Many hoofed species had evolved special adaptations to live in swamp habitat. The species belonging to this habitat that are represented in the collection plan are Hog deer (*Axis porcinus*), Sangai deer (*Rucervus eldii eldii*) and Swamp deer (*Rucervus duvaucelii*). Birds included in this sub group are Indian peafowl (*Pavo cristatus*), Green peafowl (*Pavo muticus*), Grey peacock pheasant (*Polyplectron bicalcaratum*), Kalij pheasant (*Lophura leucomelanos*), Slender billed vulture (*Gyps tenuirostris*), Cheer pheasant (*Catreus wallichii*) and Himalayan monal (*Lophophorus sclateri*).

### Eurasian Woodlands:

These forests are currently found across Eurasia along the temperate regions. These forests are dominated by single tree species and broken by open meadows. The species of this forest type that are represented in the current collection plan are Red deer (*Cervus elaphus*), Sika deer (*Cervus nippon*), Pere David's deer (*Elaphurus davidianus*), Fallow deer (*Dama dama*), Mouflon (*Ovis gmelini*), Amur leopard (*Panthera pardus orientalis*) and Eurasian lynx (*Lynx lynx*).

### Aquatic (Fresh Water)- Ganga Wetlands (Asia):

Freshwater biomes include lakes and ponds (standing water) as well as rivers and streams (flowing water). They also include wetlands. Humans rely on freshwater biomes to provide aquatic resources for drinking water, crop irrigation, sanitation, and industry. Lakes and ponds are found in terrestrial landscapes and are, therefore, connected with abiotic and biotic factors influencing these terrestrial biomes. Fresh water is the lifeline of our planet, and freshwater ecosystems connect people with the resources they need to thrive. But when rivers, lakes and wetlands are degraded, their ability to

provide reliable supplies of clean water and to support the species on which millions of people depend is threatened. However, they have historically been ignored during the development of conservation initiatives such as protected areas and other management interventions. India has a rich variety of freshwater ecosystems such as rivers, lakes, ponds, wetlands, aquifers, and streams which together occupy just 0.1% of the Earth's surface yet support 17% of the global human population and 8% of global biodiversity. India is one of the most mega-biodiverse countries in the world and around 10% of India's animal species are associated with freshwater ecosystems, several of which are unique to India. The Indo-Gangetic system exhibits one of the highest richness of large-bodied freshwater species (freshwater mega-fauna) in the world and supports unique and threatened species.

Among the species that would be exhibited as a part of freshwater biomes, species such as the Gharial (*Gavialis gangeticus*), Sarus crane (*Antigone antigone*) and Smooth coated otter (*Lutrogale perspicillata*) are keystone species. Among the reptile species, several endangered species of turtle like Red-crowned roofed turtle (*Batagur kachuga*), Northern river terrapin (*Batagur baska*), Black soft-shell turtle (*Nilssonina nigricans*), Indian eyed turtle (*Morenia petersi*), Spotted pond turtle (*Geoclemys hamiltonii*), Indian softshell turtle (*Nilssonina gangetica*) and Crowned river turtle (*Hardella thurjii*) along with Mugger crocodile (*Crocodylus palustris*) will be exhibited. Many of the species will be part of conservation breeding programme at the zoo. Regarding avifaunal assemblages of the Indo-Gangetic plains, various species of migratory waterfowl species along with the resident waterfowl species like Spot-billed duck (*Anas poecilorhyncha*), Comb duck (*Sarkidiornis sylvicola*), Garganey (*Spatula querquedula*), etc., will be part of the collection plan. Among the larger species of birds, Painted stork (*Mycteria leucocephala*), Open billed stork (*Anastomus oscitans*), Black necked crane (*Grus nigricollis*), Rosy pelican (*Pelecanus onocrotalus*), Large egret (*Ardea alba*) and Little cormorant (*Microcarbo niger*) will be part of the collection plan. Other than several common wetland bird species, species like Darter (*Anhinga melanogaster*), Little grebe (*Tachybaptus ruficollis*), Pheasant tailed jacana (*Hydrophasianus chirurgus*), Water hen (*Amaurornis phoenicurus*), Spot-billed pelican (*Pelecanus philippensis*) and Greater adjutant stork (*Leptoptilos dubius*) will be part of the collection representing the biome.

### **Aquatic Centre:**

The aquatic centre shall house most of the fish species that are included in the collection plan. Among the fish species representing the biome Gooch catfish (*Bagarius yarrelli*) and Golden masheer (*Tor putitora*) which are the keystone species along with other fish species will be exhibited at the Aquatic centre.

### **Jungle - Congo Basin (Africa), Bandipur Woods (South Asia), Sumatra Islands (Australasia) & Amazon Delta (South America):**

Tropical forests (Jungle) are among the most diversified and threatened ecosystems world-wide. They are found along the equatorial belt and are home to the greatest diversity of terrestrial plant and animal life with new species being discovered every day. Biologically, many of these regions have

own distinctive evolutionary lineages with high rates of endemism. In terms of climate, they have consistent climate throughout the year and are some of the wettest places on planet. With an average precipitation of not less than 60 inches of rainfall every month, they are home to some of the longest rivers of the planet. They also face considerable pressure from anthropogenic activities due to large-scale deforestation and fragmentation of the forest. Collectively they are called the lungs of the planet. However, due to ongoing destruction of forest and global warming, many species from these forests are increasingly faced with the threat of extinction.

### **Congo Basin:**

Equatorial forest of Africa has some of the dense forest of the plant and are home to some spectacular diversity of animal life on the planet, they are known for their unique endemic species of great apes and monkeys and many evolutionarily distinct species of mammals. However, there is considerable loss of wildlife in the region owing to deforestation, mining, civil war, hunting for bush meat and illegal wildlife trafficking. The species that are included in the current collection plan are, Chimpanzee (*Pan troglodytes*), Bonobo (*Pan paniscus*), Bongo (*Tragelaphus eurycerus*), Gorilla (*Gorilla gorilla*), Red tailed monkey (*Cercopithecus ascanius*), Colobus monkey (*Colobus sp.*), De Brazza monkey (*Cercopithecus neglectus*), Golden bellied mengaby (*Cercocebus schrysgaster*), Greater spot nosed monkey (*Cercopithecus nictitans*), Hamlyn's monkey (*Cercopithecus hamlyni*), L'Hoest's monkey (*Allochrocebus lhoesti*), Okapi (*Okapia johnstoni*), Mandrill (*Mandrillus sphinx*) and Pygmy hippopotamus (*Choeropsis liberiensis*).

### **Bandipur Woods:**

The dense tropical forests of Asia are the oldest of all forest dating back to the Pleistocene Epoch (70 million years ago). In terms of biological richness, its only next to Amazon rainforests. Unfortunately, rainforests in Asia are being lost faster than regions elsewhere across the globe. It is projected that rain forest in South and Southeast Asia will be destroyed in the next 10 years. Tragically, habitat destruction and illegal hunting continue to threaten most of the higher vertebrates. Tropical Asian jungle is represented in the animal collection plan by Great Indian hornbill (*Buceros bicornis*), Red vented cockatoos (*Cacatua haematuropygia*), Grey jungle fowl (*Gallus sonneratii*) and Red jungle fowl (*Gallus gallus*) among birds, and by Golden langur (*Trachypithecus geei*), Lion-tailed macaque (*Macaca silenus*), Assam macaque (*Macaca assamensis*), Pig-tailed macaque (*Macaca nemestrina*), Spectacled langur (*Trachypithecus obscurus*), Indian pangolin (*Manis crassicaudata*), Babirusa (*Babirusa babirusa*), Fishing cat (*Prionailurus viverrinus*), Rusty-spotted cat (*Prionailurus rubiginosus*), Jungle cat (*Felis chaus*), Bengal tiger (*Panthera tigris tigris*), Giant squirrel (*Ratufa indica*) and Indian mouse deer (*Moschiola indica*) among mammals.

### Sumatra Islands:

The forests of Borneo and Sumatra some of the finest examples of moist forest in the world with its representative Australasian fauna. The species included in this zone are Red vented cockatoos (*Cacatua haematuropygia*), Proboscis monkey (*Nasalis larvatus*), Hoolock gibbon (*Hoolock hoolock*), Orangutans (*Pongo sp.*), Babirusa (*Babyrousa babyrussa*), Clouded leopard (*Neofelis nebulosi*), Malayan tapir (*Tapirus indicus*), Sumatran tiger (*Panthera tigris sumatrae*), Binturong (*Arctictis binturong*) and Banteng (*Bos javanicus*).

### Amazon Delta:

The Amazon wet forest is the largest of all rainforests and accounts for about 60 percent of Earth's remaining tropical rainforest. It is home to more species of plants and animals than any other terrestrial ecosystem on the planet accounting to almost 30% of terrestrial diversity. It has a spectacular diversity of amphibians, birds, insects, reptiles and mammals. Among the birds that are represented in the collection are, Harpy eagle (*Harpia harpyja*), Black and White hawk eagle (*Spizaetus melanoleucus*), Keel billed toucans (*Ramphastos sulfuratus*), Quetzal (*Pharomachrus sp.*), St. Lucia Amazon's (*Amazona versicolor*), St. Vincent Amazon's (*Amazona guildingii*), Umbrella bird (*Cephalopterus sp.*), Horned guan (*Oreophasis derbianus*), Pale winged trumpeter (*Psophia leucoptera*), Grey winged trumpeters (*Psophia crepitans*), Cock of the Rock (*Rupicola sp.*) and Grey-winged trumpeter (*Psophia crepitans*). Among mammals, Nancymae' owl monkey (*Aotus nancymae*), Bearded saki (*Chiropotes chiropotes*) White faced saki (*Pithecia Pithecia*), Red howler monkeys (*Alouatta macconeli*), Red faced spider monkey (*Ateles paniscus*), Spider monkey (*Ateles sp.*), Uakari monkey (*Cacajao calvus*), Woolly monkey (*Lagothrix sp.8*, Baired's tapir (*Tapirus bairdii*), Black lion tamarin (*Leontopithecus chrysopygus*), Emperor tamarin (*Saguinus imperator*), Golden lion tamarin (*Leontopithecus rosalia*), Chilean pudu (*Pudu puda*), Northern pudu (*Pudu mephistophiles*), Two toed sloth (*Choloepus sp.*), Pacas (*Cuniculus paca*) and Capybara (*Hydrochoerus hydrochaeris*) are represented in the collection plan.

### Grassland - Great Savanna (Africa) & Kaziranga Grasslands (Asia):

Tropical grassland with scattered trees and shrubs. The word savanna comes from the 16th-century word "zavanna", which means "treeless plain." They are restricted to the tropics usually found between a tropical rainforest and a desert with defined dry and wet seasons respectively. Rainfall is restricted with an average annual rainfall between 100 cm and 150 cm. Globally, savanna habitats are present between the tropics and equator in places such as Africa, Australia, India, and South America. Worldwide, savanna habitats are known to harbour rich mammalian assemblages, particularly large bodied species. However, it can easily be disturbed by climate change and anthropogenic activities. The habitat faces severe stress due to landscape alterations from intensive agriculture, habitat fragmentation, illegal hunting and livestock production which causes desertification of these grasslands. Worldwide Savanna grasslands are known to differ in faunal and floral structure. The current

collection plan for species from the region include those that are conservation dependent and a few representative species of the biome.

### **Great Savanna:**

In Africa, Savanna grasslands dominate the Eastern part of the continent stretching from Kenya to South Africa. These biomes are home to some of the unique and greatest congregations of hoofed animal species along with associated carnivores notably at the Maasai Mara in Kenya and the Serengeti in Tanzania. These two are home to one of the most unique animal migrations of the world. There are several flagship species includes the Black rhinoceros (*Diceros bicornis*) and the South African lion (*Panthera leo melanochaita*) from the region. Among mammals, Common eland (*Tragelaphus oryx*), Gemsbock (*Oryx gazela*), Sable antelope (*Hippotragus niger*), Mountain reedbuck (*Redunca fulvorufula*), Lechwe (*Kobus megaceros*), Sitatunga (*Tragelaphus spekii*), Blesbok (*Damaliscus pygargus phillipsi*), Common waterbuck (*Kobus ellipsiprymnus*), Defassa waterbuck (*Kobus ellipsiprymnus defassa*), Greater kudu (*Tragelaphus strepsiceros*), Kafue Flats lechwe (*Kobus leche*), Lesser kudu (*Tragelaphus imberbis*), Lowland nyala (*Nyala angasii*), Roan antelope (*Hippotragus equinus*), Bontebok (*Damaliscus pygargus*), Impala (*Aepyceros melampus*), Thomson gazelle (*Eudorcas thomsonii*), Masai giraffe (*Giraffa camelopardalis tippelskirchi*), Hippopotamus (*Hippopotamus amphibious*), Patas monkey (*Erythrocebus patas*), Blue monkey (*Cercopithecus mitis*), Red river hog (*Potamochoerus porcus*), Black rhinoceros (*Diceros bicornis*), White rhinoceros (*Ceratotherium simum*), Southern African lion (*Panthera leo melanochaita*), Zebra (*Equus sp.*), Baboon (*Papio sp.*), African Cape buffalo (*Syncerus caffer*) and Wildebeest (*Connochaetes taurinus*) are included in the collection plan. Among the birds, Secretary bird (*Sagittarius serpentarius*), Shoebill stork (*Balaeniceps rex*) and Ostrich (*Struthio sp.*) are represented in the collection plan.

### **Kaziranga Grasslands:**

South Asia is dotted with grasslands, mostly across peninsular India and cover 17% of India's landmass. they differ from the open grassy African savanna grasslands in having dense woodland in between grasslands due to the monsoon climate with good rainfall. These landscapes boast unique and endangered faunal species which are one of the most threatened from the region. Yet they are one of the least studied and undervalued habitats in the country. The species that are represented from savanna grasslands of the Indian subcontinent are Greater Indian bustard (*Ardeotis nigriceps*), Bengal florican (*Houbaropsis bengalensis*), Common kestrel (*Falco tinnunculus*), Crested serpent eagle (*Spilornis cheela*), Peregrine falcon (*Falco peregrinus*), Long billed vulture (*Gyps indicus*), Spotted owl (*Athene brama*), Indian eagle owl (*Bubo bengalensis*), Barn owl (*Tyto alba*), Ring necked pheasant (*Phasianus colchicus*), Black francolin (*Francolinus francolinus*) among birds, and Leopard (*Panthera pardus*), One horned rhinoceros (*Rhinoceros unicornis*), Indian grey wolf (*Canis lupus palipes*), Ratel (*Mellivora capensis*), Blackbuck (*Antelope cervicapra*), Porcupine (*Hystrix indica*) and Pygmy hogs (*Porcula salvania*) among mammals.

## **Steppe - Mongolian Steppe (Asia) & Australian Outback (Australia):**

Steppes are grassland found in temperate regions located between the tropical and polar regions. These grasslands in temperate region are semi-arid with limited rainfall of about 10-20 inches of rain each year and characterized by dry and short grassy plains with hardly any tree growth. These grasslands endure prominent climatic variability with hot summer and cold winter. They are the largest terrestrial biomes, supporting rich faunal assemblages and provide invaluable ecosystem services for humans. Global climate change, anthropogenic pressure and agricultural practices had led to degradation and reduction of steppe ecosystems. International Union for Conservation of Nature has recognized temperate grasslands as one of the most threatened biomes of all. They are distributed in North and South Americas, Asia and Australia.

### **Mongolian Steppe:**

Spread across Asia and Europe, the Eurasian steppe is the largest steppe in the world occurring between Tibetan Plateau to the south and the forests of Siberia to the north respectively. The region is known to harbor regionally endemic genetic lineages of faunal assemblages that are threatened with extinction. Among the mammals, Przewalski's horse (*Equus przewalskii*), Saiga antelope (*Saiga tatarica*) and the Goitered gazelle (*Gazella subgutturosa*), are represented in the current collection plan along with few bird species.

### **Australian Outback:**

In Australia, the steppe is called veldt. Steppe in Australia covers almost half of the continent. It is divided into hot arid steppe and the cold arid steppe that cover the east and southern regions respectively. The keystone species of the Australian steppe are marsupials such as the kangaroos (Red kangaroo (*Macropus rufus*) and Grey kangaroo (*Macropus giganteus*), Wombat (*Lasiornhinus sp.*) and the Koala (*Phascolarctos cinereus*) that are represented in the current collection.

## **Tundra– Arctic centre (Arctic & Antarctica), Himalayan Highlands (Asia) & Yukon Creek (North America):**

Tundra(s) are among the world's youngest, coldest, harshest biomes, with extreme temperatures (–60°C to 25°C) and low rainfall and comprises only about 5% of the Earth's terrestrial surface. Tundra habitats worldwide are divided into the Arctic tundra, the Antarctic tundra and the Alpine tundra. The Arctic tundra biome is geographically restricted to a strip around the margins of the Arctic Ocean. The Arctic tundra biome is still characterized by relatively pristine ecosystems over large areas compared with other biomes on Earth. Antarctic tundra, although isolated, is relatively rich in biodiversity. This ecoregion is composed of ice-free patches of land distributed along of the east Antarctic coastline. These environments are far from invulnerable, displaying sensitivity to human disruptions and climate

change. Global warming could radically change tundra landscapes and what species are able to live in them destabilization the tundra ecosystems. In this regard, Arctic biodiversity is at peril due to climate change. Alpine tundras are limited in the number of animal species and diversity. Species belonging to tundra will be helpful in educating the public about climate change. Animals in tundras tend to be rather large, considering the severe environments in which they live. Morphologically and physiologically, greater body size confers advantage in colder regions when there is less surface area relative to volume for heat-dissipation.

### **Arctic Centre:**

From the Polar tundra, Gentoos penguins (*Pygoscelis papua*) and Magallanes penguin (*Spheniscus magellanicus*) will be represented. Given the environmental requirement of the species, all species belonging to tundra biome will be exhibited in climate-controlled enclosures.

### **Himalayan Highlands:**

Among species from tundra of Asian sub-continent, keystone species that live in the cold alpine tundra, Snow leopard (*Panthera uncia*), Lynx (*Lynx lynx*), Brown bear (*Ursus arctos*) and Musk deer (*Moschus leucogaster*) will be represented. The Snow leopard is the apex predator of the Asian tundra followed by Brown bear.

### **Yukon Creek:**

From continental North America and Europe, Arctic tundra is represented by Big horn sheep (*Ovis canadensis*), American brown bear (*Ursus arctos horribilis*), Reindeer (*Rangifer tarandus*) and the Grey wolf (*Canis lupus pallipes*). Tundra species are also known to migrate over long distances particularly reindeers that are known for their annual migration.

### **Main Plaza (Celebration stage): The Main plaza and Celebration stage:**

The main plaza will be located at the zoo entrance and it includes the celebration stage. Visitors will encounter the celebration stage before venturing in to the animal exhibit zones of the zoo. The Main Plaza provides easy and direct access to all the Zoo's exhibits. The Celebration stage located in the Main Plaza will include various animal sculptures and fountains to refresh minds of visitors.

The second theme of display is integration of evolutionary history of life on earth. The biotic diversity is made of organism that range from unicellular to highest form of vertebrates. The concept of this thematic exhibit of evolutionary science is to exhibit species so as to elucidate the zoo visitors about the history and evolution of life on earth in a nutshell. The concept title of this theme at the zoo is to be called as "Island of Life" and constitutes three multispecies zones.

### **Island of Life (Aviary):**

The zone constitutes aviary that showcases avifaunal assemblages of Asia and Australia where different species live and fly together in a walk-through exhibit. The tentative species that will occupy the aviary are the Plum headed parakeet (*Psittacula cyanocephala*), Ring necked parakeet (*Alexandrinus krameria*), Paradise fly catcher (*Terpsiphone paradise*), Indian treepie (*Dendrocitta vagabunda*), Alexander parakeet (*Palaeornis eupatria*), Glossy cockatoos (*Calyptorhynchus lathami*) and White tail cockatoos (*Zanda latirostris*). The area will also constitute a butterfly garden that shall house various species of butterflies along with and Amphitheatre that will be useful for education related activities.

### **Island of Life (outdoor):**

This zone will constitute enclosures that would house animal assemblages from Africa (White lion (*Panthera leo*), Talapoin monkey (*Miopithecus sp.*) and Dik dik (*Madoqua sp.*), Aldabra tortoise (Aldabrachelys gigantea), Australia (Tree kangaroo (*Dendrolagus sp.*) and Tasmanian devil (*Sarcophilus harrisii*) Komodo dragon, (*Varanus komodoensis*), mainland Asia (Mandarin duck (*Aix galericulata*), Purple moorhen (*Porphyrio porphyrio*), Water monitor lizard (*Varanus salvator*), Water deer (*Hydropotes inermis*) and Muntjac sp. (*Muntiacus sp.*), North America (American Alligator (*Alligator mississippiensis*) and South America (Chilean Flamingo (*Phoenicopterus chilensis*), Morelet's crocodile (*Crocodylus moreletii*), and Goeldi's marmoset (*Callimico goeldii*).

### **Island of Life (Forest dome):**

This zone will constitute species that that are adapted to live in rain forest, including many nocturnal species like amphibians and other invertebrates. All the species will be housed in a rainforest dome where an artificial rainforest will be created. The species that are included in this zone are Hedgehog (*Hemiechinus collaris*), Slender loris (*Loris tardigradus*), Slow loris (*Nycticebus bengalensis*), Tokay gecko (*Gekko gecko*), Bamboo pit viper (*Trimeresurus gramineus*), Indian python (*Python molurus*), Banded krait (*Bungarus fasciatus*) and various species of invertebrates and amphibians endemic to India. Also next to the forest dome, a visitor orientation centre will be created. The objective of this centre is to give the visitor an overall sense of the organization's direction, vision, mission and achievements of GZRRC. A number of interpretive dioramas are planned that reflects the history of Reliance Industries limited and its achievements and commitments for wildlife conservation and animal welfare in general.

## **Layout of Greens Zoological Rescue and Rehabilitation Centre**

The Zoological Park plan shall also include the following facilities:



- i. Visitor facilities (Drinking water points, Rest rooms, Lockers, Child care room, Kiosk, Restroom).
- ii. Theme based gate
- iii. Parking area
- iv. Reception center and ticketing counter
  - v. Rest shed
  - vi. Amphitheater
  - vii. Canteen
  - viii. Souvenir shop
  - ix. Landscaped garden
    - x. Interpretation center
    - xi. Battery Operated Car Service
    - xii. Office administration building
    - xiii. Animal Food Zone cum Kitchen
    - xiv. Animal Hospital
      - xv. Facilities for disabled people/people with special needs
      - xvi. First aid stations

As prescribed by the Central Zoo Authority, more than 30% of the total area of the facility has been kept as green cover as mandatory under Recognition of Zoo Rules, 2009. Also, that the animal housing area is kept within 30% of the total area.

Table 4.3: Proposed Zonation of Greens Zoological Rescue and Rehabilitation Centre, Jamnagar

S. No	Zone	Area in Acres
1.	Zoological Park	196.65
2.	Rescue and Rehabilitation Centre	72.77
3.	Conservation Breeding Centre for One-horned Rhinoceros	6.35
4.	Rescue Centre for Exotic Animals (I)	50
5.	Rescue Centre for Exotic Animals (II)	54
6.	Animal Quarantine	9
7.	Rescue Centre for Herbivores	20

S. No	Zone	Area in Acres
8.	Asiatic Lion Care, Medical Research and Hospital	49.5
9.	Rescue and Conservation Centre for African Rhinoceros	39.68
10.	Avian Conservation Breeding Centre	10
11.	Conservation Breeding Centre for Indian species	10
12.	Cheetah Conservation and Research Centre (I)	3.19
13.	Satellite Rescue Centre for Leopards	9
14.	Extension III of Satellite Rescue Centre (Reptiles, Bears and Macaques )	13
15.	Extension II of Satellite Rescue Centre for Leopards	10
16.	Extension I of Satellite Rescue Centre for Leopards	5
17.	Bear Care Centre	10
18.	Cheetah Conservation and Research Centre (II)	26.00
19.	Extension for Rescue Centre for Herbivores	20.00
20.	Satellite Rescue Centre	23.00
21.	Satellite Rescue Centre for Reptiles	3.00
22.	Extension to Cheetah Conservation Centre	45.00
	Total	685.14 acres

## Rescue & Rehabilitation Centre

Rescue & Rehabilitation Centre at GZRRC is located on a 72.77 acres area next to the proposed Zoo. There will be a total of 18 enclosures at the centre. The topography of the land is diverse and enclosure designs were chosen according to specific needs of the species which will live in them. The Rescue & Rehabilitation Centre will house rescued felids, bears, primates, turtles, birds, snakes and ruminates. Larger felids will have large enclosures with water bodies and naturalistic enrichment. Enclosures for ruminates will have spacious pastures with water bodies. Enclosures for primates will be constructed using stainless steel mesh. The bears will have a completely enclosed paddock. In short, all animals in the Rescue & Rehabilitation Centre live in spacious natural enclosures tailored to species-specific needs. Much of the 75.9 acres is left as green spaces. It is proposed to have a large Hospital & Rehabilitation Nursery, a 9510 square-foot Kitchen/Nutrition Center and several small buildings which will be used for administration offices and related needs.

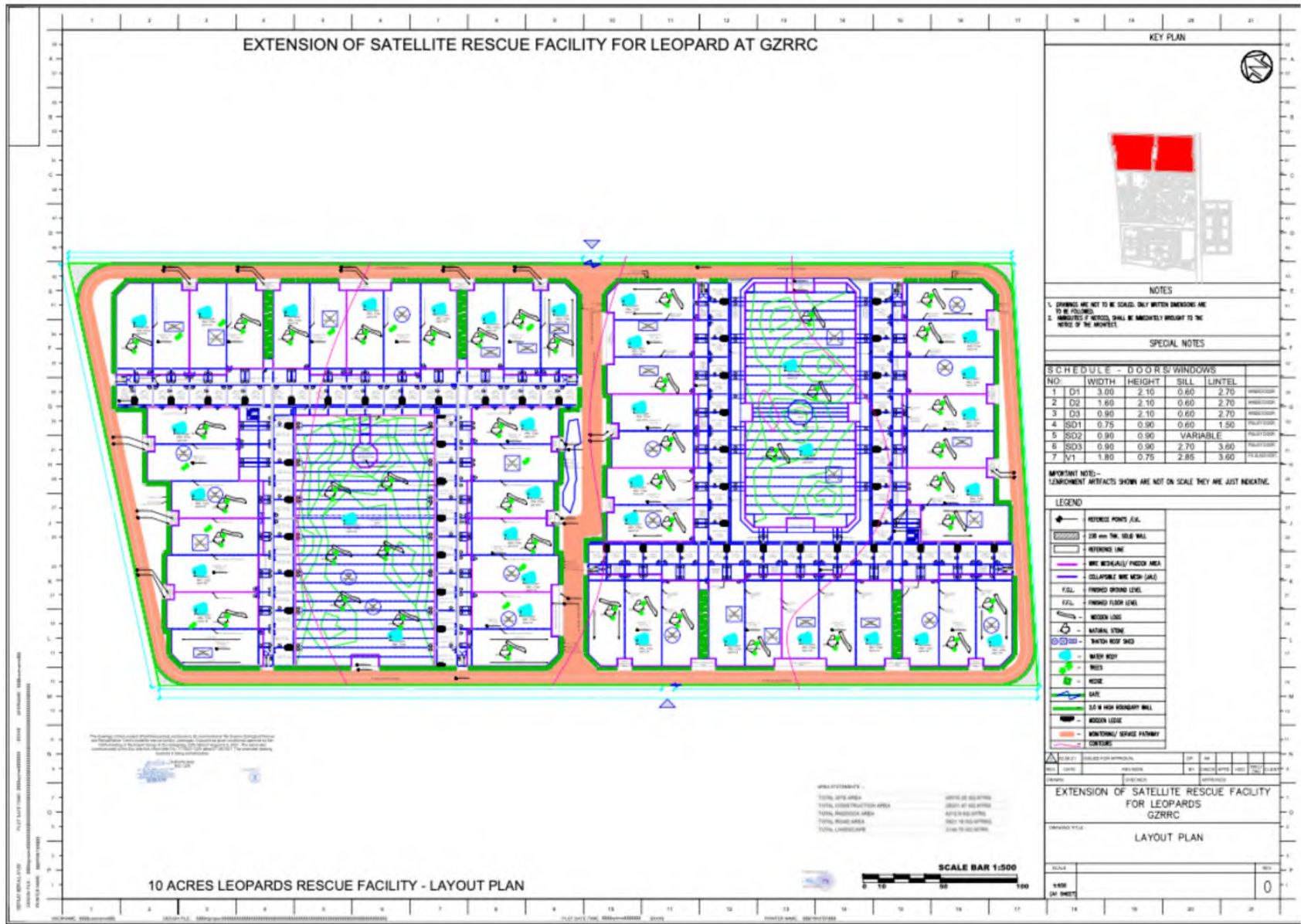


Figure 4.8: CZA Approved Layout Plan of GZRRC Leopard Rescue Facility

## **Satellite Rescue Facility**

The Satellite Rescue Facility was built in a nine-acre area. The centre was opened in 2020 to focus on the rescue & rehabilitation of large felids particularly leopards. The enclosures are designed keeping in view the biology and welfare of leopards with the all modern amenities. All the night cells are temperature controlled with high ceiling following the latest species-specific husbandry practices. Other than this, the centre has a dedicated hospital with all the necessary equipment along with a post-mortem room, an incinerator, animal kitchen, freeze room for food storage, etc. Animals that die at the facility shall undergo post-mortem examination as per standard veterinary practices to deduce the reasons of death of the animal. Considering the biosecurity issues, there is a dedicated standalone post-mortem room at the facility that is isolated from the live animal area. The facility has its own rest room, equipment cleaning, specimen preparation and storage/disposal facilities to prevent movement of fomites. There will be a lot of animal waste (faeces and excrement waste, animal carcasses, food waste) that will be generated while running a zoo and if not careful and disposed in a bio-secure way, will be hazardous for animals, staff and visitors at the facility. An ‘eco-friendly’ incinerator that will be used for the safe disposal of animal/biomedical waste as per SOPs is installed within the facility. All the animals at the facility should be fed well in accordance with their dietary and nutritional requirements. GZRRC has dedicated staff that provide food for every animal based on the required protein, fat, fiber, carbohydrates, vitamins and minerals of each animal/species needs to make sure the animals are healthy. The facility has a dedicated animal kitchen facility that has all facilities for storage, food preparation and processing. The facilities include stainless steel preparation tables, cold and dry storage, oversized shelves for food storage and wash areas. Based on the recommendations, the feed is hygienically packed at the kitchen and delivered to the animal keepers who in turn prepare meals for individual animals. GZRRC also has a dedicated meat storage freezer facility which is used to store meat. It consists a reception room, where fresh meat is received and inspected and holding rooms where the meat is stored at temperatures of ~-40 degrees centigrade which arrests any microbial contamination. The facility has a dedicated veterinary hospital equipped with a surgical theatre, x-ray machine, ultra sound machine, animal tranquilizing equipment, pharmacy and pathology lab thus ensuring proper care and health of the animals.

Cognitive enrichment of captive animals at the centre include puzzle feeders and feeding routines that encourage animals to forage for food, novel objects that elicit hunting behaviour, climbing structures that enhance habits, olfactory stimulation via the introduction of new scents and enclosure rotations. By using these techniques, the animals are stimulated to investigate and explore their surroundings. All the enclosures have water sprinkles along with facilities for fresh water for the animals.

## **Extension of Satellite Rescue Facility (Extension 1)**

The Extension of Satellite Rescue Facility (Extension 1) is being built in a 5-acre area adjacent to Satellite Rescue Facility. The facility is an extension of the Satellite Rescue Facility to accommodate rescued leopards. Among the enclosures in the Extension of Satellite Rescue Facility, there are about 16 large enclosures that are built for housing rescued leopards. It is proposed to house 80 leopards at this facility. Each enclosure has a large paddock with secondary kraal available. The paddock area

constitutes enrichment along with many climbing structures for the animals. The enclosures do have dedicated night cells with squeeze tunnels for observing and treating animals. All the night cells are air-conditioned with enrichment provided.

## **Second Extension of Satellite Rescue Facility (Extension 2)**

To augment the existing capacity to house rescued leopards, it is envisaged to expand the current facilities at the Satellite Rescue Facility. In this regard, a 10-acre land area adjacent to the current Satellite Rescue Facility (Extension 1) is proposed for expansion. The facility shall have a capacity to hold more than 200 leopards. As in earlier case, the facility will be having enclosures with large paddock areas and night cells with all the attributes as in the current enclosures at Satellite Rescue Facility.

## **Extension 3 of Satellite Rescue Facility**

The Third Extension of Satellite Rescue Facility is being built in a 13-acre area adjacent to Satellite Rescue Facility. The facility is being built to accommodate rescued bears, macaques and reptiles. Enclosures of various sizes and dimensions will be built to accommodate rescued crocodiles and other reptiles. The water pools in these enclosures are provided with water filtration system, pool heaters to control water temperatures in winters. Provisions are made to provide the crocodiles to have access to heating sources by providing heat through IR-A radiation lamps. Besides these, there are a few enclosures that will be used to house rescued snakes and turtles/tortoises. All the enclosures will be provided with adequate lighting and heating facilities along with water filtration systems depending on the species. The extension facility currently has two enclosures for rescued Himalayan bears. The paddock areas of these enclosures are provided with all enrichment for the bear that include pool, plantation, hammocks and wooden stands. The night cells are provided with similar amenities like those provide to leopards at the facility. Enclosures to house rescued monkeys (macaques and langurs) are also being built within the extension facility.

## **Asiatic Lion Care, Medical Research and Hospital**

The Asiatic Lion Care and Hospital center envisages actions aimed at averting risk of extinction of Asiatic lion by sustaining them in captivity through scientific conservation management as a part of the species revival plan. At GZRRC, research would be carried out to standardize various husbandry practices of the species. In recent years, there have been outbreaks of diseases like Canine Distemper, Babesiosis, Leptospirosis, etc. in the wild Asiatic lion population that lead to death of many individuals. Such outbreaks among lions in other parts of the world have caused the decimation of the extant wild population. Research would be carried out on the diagnosis and prognosis of diseases that affect Asiatic lion populations and develop methods to contain and treat such diseases. In recent years there had been an increase in man-animal conflict due to various reasons. In this regard, several lions are being rescued which need housing facility. The upcoming centre will be spread over an area of 49.5

acres which include enclosures, hospital and nursery care facilities. The Centre will help in the rescue and conservation efforts of Asiatic lions and provide a helping hand to the efforts made by the Gujarat Forest Department in the conservation of Asiatic lion.

### **Rescue Centre for Exotic animals (I & II)**

In addition to the Rescue & Rehabilitation Centre which is being established to house rescued felids and bears, further two extensions (Extension 1 & Extension 2) of Rescue & Rehabilitation Centre are planned in a phased manner. The main purpose of the two extensions is to house rescued (non-native) herbivores, omnivores, lesser carnivores, primates, marsupials, and birds. Extension 1 and Extension 2 will be developed in an area of 50 acres and 54 acres respectively. Areas are designated for herbivores, omnivores, lesser carnivores, primates, marsupials, and birds. Enclosures will be designed based on the species to be housed that will be rescued. The facilities will augment the efforts of GZRRC in housing rescued exotic species.

### **Bear Care Centre**

The Bear Care Centre will be constructed on a 10-acre area at GZRRC. The facility is intended to be a rescue and rehabilitation centre for rescued Asiatic bears and Sloth bears. The centre will have 16 enclosure that shall house over 70 rescued bears. The enclosures will have land/rockscapes that mimic natural habitat of the species. The enclosures will be designed in a manner which will consolidate handler/shelter areas, minimizing their visual impact. All enclosures shall have various enrichment opportunities that will encourage species specific behaviour. The paddocks shall provide a variety of experience for the animals like water features, mounds, valleys, deadfall, log piles and climbing structures with abundant shades and trees.

### **Avian Conservation Breeding Centre**

Many of the Avian species both within and outside India are threatened with extinction. Many of these species need ex-situ intervention to save the species from extinction. The Avian Conservation Breeding Centre will be an integral part of the GZRRC. The centre shall be spread over an area of 10 acres. The goal of centre is captive breeding of native as well as non-native avifaunal species that are threatened with extinction with the long-term aim of re-establishing viable wild populations. The priority of the conservation breeding centre is conservation of the gene pool of the rare and endangered avifaunal species and to prevent their extinction. The native species of birds include the Great Indian Bustard (*Ardeotis nigriceps*), Lesser florican (*Sypheotides indicus*) and White-rumped vulture (*Gyps bengalensis*). Among the non-native species, Spix macaw (*Cyanopsitta spixii*), Lear's macaw (*Anodorhynchus leari*), Saint Vincent's amazon (*Amazona guildingii*) and Saint Lucia amazon (*Amazona versicolor*). Many of the above species are critically endangered and some are extinct in the wild and need ex-situ efforts for their survival. The centre shall have designated breeding aviaries along with chick rearing centres and kitchen.

## **Rescue Centre for Herbivores**

Greens Zoological, Rescue and Rehabilitation Centre is dedicated to the protection and preservation of endangered herbivores. Various threatened herbivores shall be housed at the centre thereby providing demographic and genetic backup which shall act as an insurance population to wild populations. The centre shall be spread over an area of 20 acres. The centre shall build knowledge of animal biology and husbandry and provide coordinated management and planning recommendations for various species in captivity both within and outside India. This rescue centre will be designed to house herbivores in the finest levels of welfare.

## **Cheetah Conservation and Research Centre (I)**

Cheetahs are the fastest land mammals. Historically, their distribution range extended from Asia to Africa. Currently, they are found only in few isolated pockets in Africa and Asia. Through the range, the species is prosecuted and every year, many animals are rescued from the wild. Many of the range countries of the species have inadequate facilities to care for these rescued animals and are kept in miserable and unsafe conditions that do not meet the standards of captive welfare of cheetahs. In this regard, GZRRC shall create a rescue centre spread over 3.19 acres, that shall cater for the needs of rescued Cheetahs. The centre shall be committed to the conservation of the species through rescue by providing the best care possible. Also, the rescued animals at the centre can act as a potential genetic source for future breeding programmes elsewhere. The Cheetah Care Centre shall have facilities to house rescued cheetahs under ideal conditions of welfare so that these animals can express species-typical behaviour patterns. This centre will also contribute to the field of research of Cheetah biology and develop research tools to aid in the conservation of the species in the wild. We have proposed a separate

## **Extension of Rescue Centre for Herbivores**

We are planning to develop a separate rescue facility for the lifelong care and welfare of Mega herbivores and equids. This facility will have several large, naturalistic species-specific enclosures that will cater to the unique welfare requirement of rescued large herbivores.

## **Conservation Breeding Centre For Indian Species**

GZRRC is committed to the conservation of the rich biodiversity of the Indian subcontinent. The Conservation breeding Centre for Indian Species will contribute to the captive population management of some of the most threatened species of endemic fauna and create the necessary research outputs to conserve them in the wild, while maintaining an insurance stock in captivity.

## **Satellite Rescue Centre**

In cognizance of the long-term goals of the Greens Zoological, Rescue and Rehabilitation Centre, a Satellite Rescue Centre spanning 23 acres is being developed to house rescued animals in need of long-term care and welfare. The proposed Satellite Rescue Centre will be developed as a zone of expansion to house wildlife with varying levels of biological and behavioural requirement. The focus of the facility in alignment with the goals of GZRRC will be to provide long-term care and welfare to rescued captive animals. The facility will be linked to the modern veterinary healthcare infrastructure of GZRRC and will have standalone keeper, management and veterinary staff dedicated to the care of the animals housed in it. The Satellite Rescue Centre will be developed as a model facility that will pioneer rescued captive animal management as a special branch of zoo biology. This facility will be integrated with the conservation and welfare focused ethos of other GZRRC facilities and act as a learning and capacity building centre for regional and international partner *ex-situ* institutions.

## **Rescue Centre for Reptiles**

Captive Reptile welfare is often overlooked in the context of *ex-situ* conservation. Greens Zoological, Rescue and Rehabilitation Centre's Rescue Centre for Reptiles aims to provide the finest rescue facility for the conservation and welfare of captive Reptiles. Spread over three acres of land, this facility will have state-of-the-art equipment, modern species-typical enclosure supported by subject matter experts and technical staff capable of managing rescued captive reptiles. This centre will lead the way for the rescue and conservation of captive reptiles in the region.

## **Extension of Cheetah Conservation Centre**

Spread over an area of 45 acres the Extension to Cheetah Conservation Centre epitomizes GZRRC's commitment to restoring the cheetah to the Indian Grasslands. The Cheetah Conservation Research Centre is going to be the flagship conservation initiative of GZRRC to protect and proliferate the indigenous biodiversity of the nation. This facility will have modern enclosures that will house Cheetahs in naturalistic social configurations that will encourage the expression of species-typical behaviours. The facility will be managed by subject matter experts, scientists and veterinarians with experience in Cheetah conservation. This centre will not only maintain a scientifically managed captive population of Cheetahs but it will also aid in the capacity building of forest department personnel and veterinarians from partnering institutions for the better management of wild population of cheetahs. By focussing on scientific captive management of cheetahs, this centre will strengthen the *in-situ ex-situ* linkages for the conservation of this species.

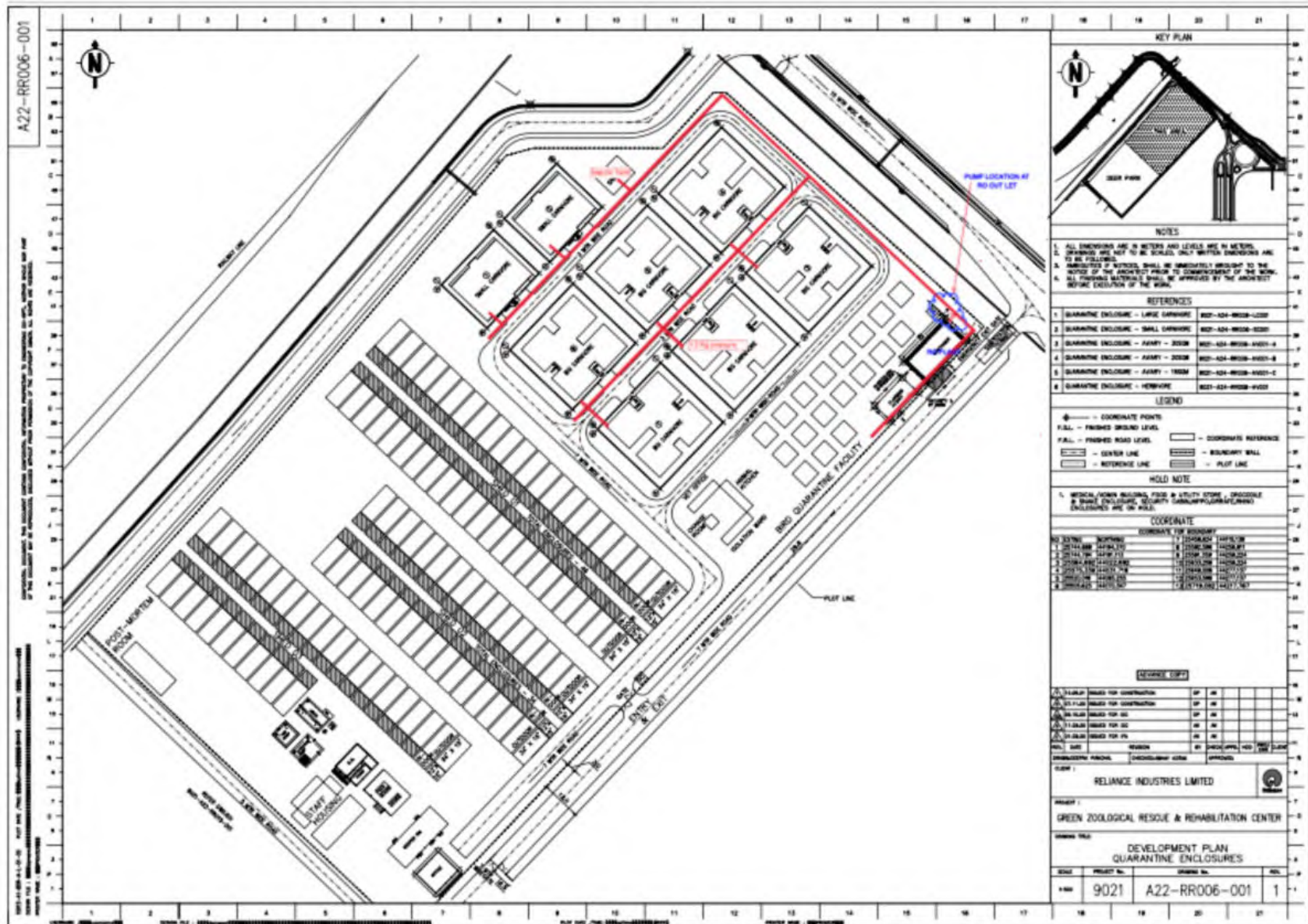


Figure 4.9: Animal Quarantine at Greens Zoological Rescue and Rehabilitation Centre

## Animal Quarantine

The zoo has a dedicated quarantine facility to quarantine newly acquired /sick animals of the zoo. It has been constructed on an area of 9 acres. It constitutes 5 sections, (namely Wing A, B, C, D and E) along with other facilities to house birds and reptiles. The quarantine facility of GZRRC complies with all the technical requirements for the quarantine of imported zoo animals. The quarantine facility is equipped with its own animal hospital, kitchen, pharmacy and post-mortem room. The quarantine area has been kept away from the Zoo and the Rescue and Rehabilitation Area, as a separate area away from any other inhabited area. This quarantine is capable of housing 144 large carnivores, 36 small carnivores, 8 mega herbivores, 50 primates, 2000 lizards, 200 small snakes, 1200 turtles and tortoises, and 16 birds. An additional 33 acre is being planned which can quarantine 600 herbivores along with more than 4000 invertebrates and molluscs.

Animal cages are separated from each other with additional barrier to prevent transmission of infections via aerosol transmission. GZRRC quarantine facility has a separate enclosures for birds and reptiles with access to large water bodies. The water bodies in these quarantine facilities are large and deep enough to house medium to small sized species aquatic birds and mammals. To ensure security, the quarantine centre is surrounded by a 8m boundary wall with dual-side overhangs on both sides. As per the norms and regulations for quarantine facilities laid down by the Central Zoo Authority (CZA), the GZRRC quarantine centre has single entry and exit point.

The quarantine facility of GZRRC is designed to have sufficient amenities for receiving and caring for animals from different continents and providing appropriate health care before they are released into the main display enclosures. GZRRC quarantine staff can prepare each enclosure to species-specific requirement of a particular species. Keepers and biologists can also modify enclosures to meet the individual requirement of the species under care. The facility has system in place to prepare quarantine areas prior to the arrival of the animals. Dedicated transport vehicles “Animal Ambulances” with provision of hydraulic unloading system will be used to transport animals in a climate-controlled stress-free environment. The quarantine area has provision to disinfect cages/crates used in transportation both before and after. Signages are provided at entry point with details of the animals to be quarantined. A change room is provided for the attending personnel with provision of all necessary personal protective equipment. Foot baths with Khorsolin disinfectant are provided at the entry point of all sections. Hand sanitation provision is made at all possible locations in each wing of the quarantine centre. There should be provision for disinfection of the transporting vehicle. Different sections are designed to maintain different species of animals with indoor night houses and outdoor paddock areas as per the space required for species following standard published guidelines. All indoor areas are provided with HVAC system to maintain constant regulated temperature. Closed-circuit television (CCTV) cameras are installed in the entire quarantine area for round the clock monitoring of the Centre. Standard procedures are followed by the keepers during quarantine of the animals and the facility has been designed so that strict quarantine protocols are followed. During quarantine, staff of one section are exclusively responsible for only the concerned section and are not permitted to enter the other section. Each wing has provisions for five attendants, two para veterinarian and one veterinarian. All the equipment used in the quarantine area for cleaning, feeding and watering are maintained exclusively for the section and sterilized using standard protocols. Concrete flooring is

provided in most night houses for easy cleaning. In Wing D and E, the flooring was provided with rough Kota stone. Separate feed storage and kitchen area are present. Dedicated storage areas for feed and bio-waste are available. Liquid waste disposal will be done based on standard procedures. Provisions are made in each cell to provide drinking water (mineral water) *ad-libitum*. For the prevention of ectoparasites, disinfection is carried with Khorsolin and Vircon S and for the prevention of vectors, fly traps in each section have been provided. Each cell has provisions to place details of the respective animal that includes species, sex, animal identification number, beginning starting and ending completion of quarantine dates etc. All the animals arriving at the quarantine centre will be observed physically on a daily basis for any clinical signs/symptoms/ecto-parasites/abnormal behaviour etc. as per Standard Operating Procedures and record for the same will be maintained Food (meat) that is to be used to feed the animals will undergo ante-mortem examination. Fecal examination for each animal will be conducted and examined for gastrointestinal parasites. As a standard practice, all the animals arriving at the quarantine area from other zoos/rescue centers shall spend about 30 days as per standard guidelines. Sick Animals will be quarantined according to their respective diagnosis and treatment.

Following SOPs have been prepared and displayed at each wing of the quarantine centre. They have an established system of standard operational practices (SOPs) in place and will be followed once the animals are imported.

- i. Entry/Exit of quarantine area
- ii. Daily activity
- iii. Daily examination
- iv. Sampling
- v. Disposal of waste
- vi. Post mortem

Health check of each care taker working at the quarantine facility is being conducted every six months annually in the Reliance Township hospital.

### **Integration with Artificial Intelligence**

Modern zoos generate a lot of data related to animal welfare, health assessments and visitor movement patterns. However very few zoos have effectively implemented machine learning algorithms that can use this data to inform decision-makers towards the optimization of the available resources. GZRRC will be data-driven zoo that will gather data on animal welfare, visitor amenities, visitor feedback and use this information to create better enclosure designs and welfare practices for the animals while ensuring an immersive zoo education experience for visitors. The placement of new visitor amenities at GZRRC will be decided based on visitor movement patterns which will ensure that all amenities are accessible to visitors at various stages of their experience. GZRRC will also implement artificial intelligence tools to mitigate the risk of visitor vandalism. Areas of high visitor congregation will

be monitored through CCTV camera and adequate personnel will be deployed at strategic points to prevent animal-teasing and other forms of vandalism at the facility.

## **Sustainability**

Greens Zoological, Rescue and Rehabilitation Centre has the goal to become net carbon neutral by 2030. GZRRC recognizes the importance of sustainable practices in power and water consumption. To achieve this goal and to meet its water conservation targets, the GZRRC will undertake the following steps and ensure the long-term welfare of animals as well as meeting the goals of sustainable development of local communities, who are our stakeholders for global biodiversity conservation.

### **Sustainability goals:**

1. Reduce energy consumption by 15% within three years.
2. Reduce fresh water dependency by 10% in the next two years.
3. Evaluate and implement solid and liquid waste reduction strategies by 50% over the next five years.
4. Implement sustainable procurement practices for all animal supplies and materials within the next one year.
5. Foster a culture of sustainability within the organization.

### **Power Consumption**

1. Increase Renewable Energy Usage: GZRRC aims to transition towards renewable energy sources like solar or wind power to decrease our reliance on fossil fuels. We will explore options for installing solar panels on zoo buildings or partnering with renewable energy providers.
2. Enhance Energy Efficiency: GZRRC will implement energy-saving measures throughout the zoo. This may include upgrading to LED lighting, installing occupancy sensors to turn off lights in unoccupied spaces, and utilizing energy-efficient appliances.
3. Behavioral Change Programs: GZRRC will educate staff and visitors on energy conservation practices. This can involve signage encouraging shorter showers, turning off electronics when not in use, and promoting responsible energy consumption habits.

### **Water Conservation**

1. Reduce Overall Water Usage: GZRRC will identify areas of high water consumption and implement strategies for reduction. This may involve repairing leaky faucets, installing low-flow toilets and showerheads, and exploring rainwater harvesting systems.

2. **Optimize Irrigation Practices:** GZRRC will employ water-efficient irrigation methods for landscaping, such as drip irrigation or utilizing native, drought-resistant plants. Additionally, we will explore the use of recycled water for non-potable purposes, such as cleaning animal enclosures.
3. **Foster Water Conservation Awareness:** GZRRC will raise awareness about water conservation through educational programs for visitors and staff. This can involve signage highlighting water-saving tips, incorporating water conservation themes into educational tours, and showcasing water-efficient technologies used in the zoo.

### **Visitors Amenities**

Greens Zoological Rescue and Rehabilitation will have some of the finest visitor amenities that will cater to all the needs of the visitors that will help create the finest zoo visitor experience. Apart from the basic amenities like food plaza, sitting spaces, spaces for visitor interaction, plazas etc. The facility will also have modern transport systems that will take the visitors through the different sections of the facility. Special care will be taken so that the zoo and its attractions are equally accessible to visitors of all demographic groups and physical abilities.

### **Signage Design**

Signage plays an important role in the interpretation of modern zoological institutions. Signage is vital to the overall zoo experience of visitors and can act as valuable tools for zoo-educators to disseminate the right type of information to all age group of visitors. Directional signage which has multiple layout paths can help visitors tailor their zoo-experience to meet specific time-constraints. Hence the signage design should not only be safe but also provide several options for visitors to have a multi-tiered experience at the zoo.

### **Visitor Circulation**

The visitor circulation of the greens Zoological rescue and rehabilitation Centre has been designed to complement the visitor experience program. GZRRC aims to receive visitors representing a diverse demography that needs holistic design aesthetic that is cognizant of the present and the future requirement of the facility. GZRRC aims to become one of the largest animal collections disseminating conservation education to a large number of visitors per day. Studies Godínez and Fernández (2019) show that zoo visits are associated with pro-conservation behaviours in people across all demographic categories.

## **Veterinary Section**

GZRRC is developing a veterinary hospital that will cater to the prophylactic and therapeutic treatment needs of all animals housed within its facilities. The facility is projected to be the largest veterinary hospital in the country. Once operational, this veterinary hospital will be a valuable addition to the progress of veterinary science in the country. Over 10 veterinarians along with 50 paraveterinarians and other support staff will staff the facility to provide year round 24x7 care to animals. GZRRC has partnered with local veterinary colleges and state forest departments for the training of staff and students through short-duration focused courses at this facility.



## **5 Personnel Planning at Greens Zoological Rescue and Rehabilitation Centre**

Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) aims to become one of the largest and most well-reputed *ex-situ* conservation institution in the next few years. To realize this target, GZRRC relies on the support of several departments and staff that help carry forward the vision and mission goals of the organization. The Chief Executive officer is tasked with identifying the vision and mission goals and steer GZRRC and its departments toward its short-term and long-term objectives. The CEO will be supported by adequate scientific and technical staff that will help him in decision-making and running the daily operations of the zoo with a view towards realizing its long-term objectives. Good human resources planning, and recruitment will play a critical role in ensuring that GZRRC can function to high standards in animal care and providing a world class visitor experience. Members of staff will be recruited based on demonstrated experience in their respective verticals of zoo management and will be provided with avenues for skill building and growth opportunities as outlined in the capacity building section. This chapter focuses on defining and delineating the roles of each department and how that links with other departments and long-term goals of GZRRC. It is proposed to recruit staff broadly in line with the below staffing pattern. In addition to the roles listed below, additional support staff such as front-end workers (ticketing, gift store/restaurant, parking and similar roles), keepers, office assistants, maintenance assistants and drivers will be recruited on a per-need basis.

### **Roles and responsibilities of each department**

#### **Head of the organization**

The Head of the Organization is responsible for the general supervision of the officers and staff of the society and may issue necessary directions for the conduct and management of the affairs of GZRRC. The Head of the Organization shall convene and preside over all the meetings of the committee and shall ensure the execution of the decisions taken by the committee. All other powers and functions as may be delegated to him from time to time by the committee shall be exercised by the Chief Executive Officer under the supervision of the Head of Organization. The Chief Executive Officer shall also assist the Head of the Organization to perform such duties.

#### **Chief Executive Officer**

The Chief Executive Officer of GZRRC is the primary executer of the vision and mission goals of the organization. All departments falling within GZRRC report to the CEO and help them in the decision-making for the organization. The CEO is responsible for outward facing communication pertaining

to GZRRC and is the highest authority in terms of all decisions pertaining to all executive decisions at GZRRC. All departments of GZRRC must consult and seek approval of the CEO for any changes to the annual operations plan. The CEO oversees the daily operations of GZRRC and also decides policy to ensure the achievement of its long-term goals. All department heads must consult and seek approval of the CEO for any decisions that deviate from their yearly mandates.

### **Director and Assistant-Director**

The daily functioning and management of GZRRC and ancillary facilities will be overseen by the Director and Assistant Director, and the Director will serve as the officer in charge of the facility. All the management staff from other departments will report to the Director, whose role will span the supervision and development of the entire facility and its operations, including but not limited to the below-

- Preparation of Detailed Project Report, finalizing the Master (layout) Plan, Animal Collection Plan, Master Plan for the long-term development of the Zoo, and other allied facilities, their design, and its approval from the concerned authorities.
- Planning of required resources and co-ordination between different consultants, agencies in execution of the work.
- Monitoring the statutory compliance as stipulated by the Central Zoo Authority and other Government bodies.
- Forward planning and developmental work.
- Timely mobilization of resources with respect to scientific management of the zoo and Rescue Centre.
- Financial management and planning.
- Proper housing upkeep and health care of the animals.
- Monitor the acquisition/exchange/transfer of animals between zoos.
- Ensuring MIS/Record Keeping and timely submission of quarterly/yearly animal inventory to the CZA, postmortem reports and other compliance documents.
- Ensuring the welfare of the animals and visitors and scientific management of the facility.
- Safety, Security of animals, staff, and visitors.

In the absence of the Director due to tours and meetings, the Assistant Director will assume stewardship of all the roles and responsibilities of the Director's office.

## **Animal Management and Records**

The Animal management and records division is tasked with ensuring the welfare and care of animals under their care at GZRRC. The animal management division will create and maintain a husbandry and management guideline for each species housed at GZRRC. This division will oversee the execution of all animal management policies essential to the welfare of the animals. Animal welfare is one of the most crucial aspects of animal management at zoos and other conservation breeding centres. The animal management division will be overseen by the lead curator (1), supported by six curators along with assistant curators(15), supervisors(15), and keepers(400).

### **Curator**

The curator is responsible for the design, upkeep and maintenance of the collection plan for the GZRRC. This will include understanding the carrying capacity of GZRRC in terms of existing facilities, conservation objectives, visitor experience management and education programmes. The curator will align all the objectives of GZRRC with the collection plan. The curator will be assisted by site supervisors and animal keepers, who will ensure that the right amount of feed is provided to all animals based on the recommendation of the nutritionist and the veterinary department. The curator will be responsible for all animal transport from the zoo and the record keeping of the present inventory of animals. The curator will work closely with the keepers to understand the trends in captive animal health and population management to aid in decision-making.

### **Keepers**

There are more than 400 keepers working at GZRRC who are the grass-root level workers tasked with the daily care of animals housed at the facility. The Head keeper shall work under the direct supervision of the curator and will ensure that all aspects of animal husbandry and welfare management is well-executed at GZRRC. The head-keeper will also oversee all enrichment interventions at the facility and place recommendations on successful enrichment practices to the concerned curator. Senior keepers will work under the direct supervision of the head keepers to ensure that each animal receives appropriate amount of feed. The senior keeper will also maintain a keeper's diary that will be used by biologists and curators to ascertain the behavioural responses of the animals to husbandry and management practices. The junior keepers shall work under the supervision of the senior-keeper towards the execution of daily husbandry tasks at each GZRRC enclosure.

## **Animal Health and Nutrition**

GZRRC has the largest veterinary facility to provide for long-term care for all animals under its care. The GZRRC veterinarian team consists of 18 veterinarians along with 10 para veterinarians, 10 lab assistants and 10 compounders. The veterinary department is primarily responsible for all prophylactic and therapeutic interventions to provide for the optimal health and welfare of animals

housed at GZRRC. The veterinary department also employs two veterinary nutrition specialists who decide the diet for each species under the care of GZRRC. Some of the roles and responsibilities of the veterinary department are as follows:

- Routine inspection of the zoo based on health standards
- Treatment of all sick animals housed at GZRRC.
- Administration of vaccines, deworming & other prophylactic interventions which may include blood serum analysis, urine analysis or hormone analysis.
- Routine health monitoring, including physical inspections, blood sample collection, faecal sample collection, urine collection for further analysis.
- Carrying out post-mortems and reporting the same in sufficient detail to prevent disease outbreaks.
- Supervision of quarantine facilities.
- Ensure that all husbandry practices are duly followed by keepers and other staff members.
- Record keeping of all veterinary activities routine or otherwise carried out at GZRRC.

The nutrition department is also one of the responsibilities of the veterinary staff.

- Based on the species, age, sex, and seasonal requirement provision of appropriate food during the right time of the day.
- Incorporation of feed-based enrichment into the daily feeding regimen to ensure that the animals can express species-typical behaviour patterns.
- Decide food preparation protocols for each species.
- Ensure that strict hygiene and sanitation standards are followed at the GZRRC animal kitchens.
- Periodically take weight measurements of animals and based on the daily activity of the animals retune the diet.
- Creating both a general and special diet plan for each species.

### **Rescue and Rehabilitation**

There are more than 1000 zoos in the world that attracts around 1 billion visitors annually. Many of these zoos and other private organizations have animals in their inventory, which are in excess to their animal collection plan. As zoos exceed their carrying capacity in terms of the number of animals they can support, the quality of care and welfare they can provide depreciates significantly. Under some circumstances, Indian customs departments may intercept, capture, and seize illegally trafficked wildlife. These wildlife consignments often include several live animals that are in immediate need of veterinary care.

GZRRC is committed to providing long-term care and welfare to ailing animals housed at other rescue facilities. The rescue and rehabilitation wing of GZRRC is tasked with carrying out all activities related to identifying ailing animals in need for rescue to their ultimate rehabilitation at GZRRC.

The Rescue and Rehabilitation department is tasked to carry out all activities related to the rescue of different species from zoos all over the world. The rescue and rehabilitation team will be supported by the compliance team and the Director's office for all legal frameworks pertaining to national and international animal rescue operations. The Animal health & nutrition department will provide all necessary support and expertise to the rescue and rehabilitation department to ensure a smooth and incident-free transfer of animals. The veterinary team will also assist in all tasks related to the immobilization and management of animals during transport to GZRRC. The veterinary team along with the rescue and rehabilitation department shall ensure that animals transfers are free from unforeseen accidents.

The rescue and rehabilitation team will work closely with the Animal management division to ensure that the rescued animals have access to species-specific enclosures that follow husbandry practices crucial to the maintenance of species-typical behaviours in captivity.

### **Conservation Breeding & Research**

GZRRC envisages to become an institution of global repute by furthering the cause of *ex-situ* conservation for endangered fauna. The GZRRC conservation breeding research and management department will be directly involved in the management and conservation breeding of endangered species under its care. The Conservation breeding department will be tasked to identify a list of critically endangered species that require immediate conservation action.

The Lead of the Conservation breeding and research department is supported by six scientists viz., Population management (2), Animal behaviour and enrichment (4). Additionally, the department also employs the services of one animal welfare expert tasked with the audit of animal husbandry and management practices at the organization. Two experts of positive reinforcement trainings are present who work towards integrating behaviour training mechanisms with daily husbandry practices to provide better care and welfare for animals. The department also employs the services of six biologists, who collect data on the behaviour and welfare status of animals to optimize the efforts of keepers and managers at the facility.

Based on the list, GZRRC will continue its efforts to acquire and manage a viable captive population of endangered species. The conservation breeding department will identify key areas of research pertaining to the conservation and management of the species, that can secure the long-term future of the species in the wild.

The conservation breeding department will adopt advanced population management techniques to manage the species in captivity. This will include demographic management of the species to ensure the captive population thrives and produces individuals that are representative of their wild counterparts.

To achieve this target, the conservation breeding department will conduct genetic evaluations on the heterozygosity of the population. Based on the findings of the genetic evaluations the conservation breeding department will create and maintain the studbook for the said species.

Apart from maintaining the genetic diversity of the species, it is also important to preserve species-typical behaviours vital for the survival of the species in the wild. The conservation breeding team will ensure that the captive population of endangered species under its care will have access to sensory stimuli that is crucial to the expression of a near natural behavioural repertoire of the species.

The conservation breeding department will create projections for the population of the species in the wild and in captivity. Based on these projections, the department will create a conservation plan for the species that will span the timeline from the initial conservation breeding of the species to its eventual repatriation to reclaimed habitats.

### **Conservation Education**

GZRRC is deeply connected with the conservation education policy as envisaged in the national zoo policy. The conservation education department is headed by the Education lead, who will coordinate efforts to realize the vision and mission of GZRRC with its education strategy and visitor experience. The education lead is supported by a lead designer and an education assistant who will carry out visitor assessment and design the education policy to meet specified goals. The education assistant shall be responsible for the training of 10 zoo guides on various aspects of GZRRC education strategy. The Education Officer of the Zoo, Rescue and Rehabilitation Kingdom shall be responsible for the following:

1. Preparation of brochures, booklets, and other interpretative material on behaviour biology and ecology of various species housed in the zoo for their further dissemination.
2. Designing the signages at various enclosures and developing appropriately designed direction boards and appropriate warning signs for regulating movement of visitors.
3. Providing orientation and guidance to the visitors for having educative and rewarding experience at the zoo.
4. Assisting in redressal of the difficulties and grievances of visitors.
5. Training the zoo personnel to deal with the visitors in courteous and polite manner without compromising with zoo ethics.

### **Forestry, Horticulture and Landscape**

GZRRC is a modern zoo that has been designed to use landscaping and horticulture design to create an immersive visitor experience. The zoo has an extensive green belt, along with some of the most exquisite areas of greenery within and around the premises. The forestry, horticulture and landscaping department is tasked with the procurement, planting and management of the landscape, trees and

vegetation that create the unique visitor experience at GZRRC. Since GZRRC spans a large expanse of area, it is important to maintain the trees and the landscape inside and around the facility. This department is responsible for all vegetation required for the welfare and management of all animals and their enclosure at GZRRC. The horticulture department researches and acquires vegetation required for the welfare of each species based on the recommendation of the animal management and the veterinary department. This department is tasked with the acquisition of equipment and material required for the maintenance and proliferation of the GZRRC layout plan. The lead horticulturist of GZRRC is supported by an architect and lead designer who will design and create plans for the landscape of GZRRC. Supervisors(5) will oversee the execution of the landscape management plan for GZRRC. The horticulture team will be supported by 50 gardeners, who will work round the clock to ensure that the facility is well-maintained and manicured throughout the year.

### Administration and operations management

GZRRC envisages to become one of the largest well-reputed institution for *ex-situ* conservation in India. To achieve this goal, GZRRC has divided its mission goals to be carried out by various departments. The Administration and operations management department is tasked to coordinate the activities and planning of each of these departments so that they work towards achieving the common goal for the organization. The administration and operations management is tasked with auditing of the activities of each of the aforementioned departments to ensure that all departments and sub-departments are working on consonance with the needs and the requirement of the organization. The primary task of the administration department is to act as a conduit for bi-directional information transfer from the other departments to the management and vice versa. This department also ensures that information from the grassroot level of the organization is efficiently communicated to the administration. This department includes the following sections viz.,

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Sl No	Name of Department	Role of Department
1.	Accounting	The finance and accounting department is tasked with the creation of budgets, acquisition of funds and the disbursement of the same to the various departments based on the fiscal projection. The finance section also conducts regular internal audits of financial best practices within the organization to optimize the utilization of funds within GZRRC.

Sl No	Name of Department	Role of Department
2.	Engineering and construction	The Engineering and construction department works in consonance with the architectural team and is tasked with the design, implementation and maintenance of existing and proposed infrastructure at GZRRC. This department also conducts stringent quality control tests on suppliers and contractors to ensure that all facilities at GZRRC meet the highest build-quality standards.
3.	Operations	This department oversees the daily operations of GZRRC and is primarily tasked with personnel and resource management to ensure optimal care and welfare for all animals under the care of GZRRC. The operations team also works closely with all other departments based on their regular and exigent requirement, which can include acquisition of funds, personnel, vehicle, equipment among others.
4.	Marketing and research	The marketing and research department conducts in depth visitor surveys and tries to understand the current and future directions for generating more cash flows for GZRRC. This team also identifies existing and potential sources to advertise the goals of GZRRC to welcome more visitors to the facility
5.	Legal team	The legal team of GZRRC consists of experts from various fields, who ensure that GZRRC follows all norms and regulations laid down by the Government of India and its agencies along with those laid down by other national and international accreditation agencies. The legal team is also tasked with all legal and paralegal activities that are required for meeting the short-term and long-term goals of GZRRC.
6	Public relations Office	The Public relations Office at GZRRC is tasked with creating and maintaining all communications on behalf of GZRRC. Therefore the public relations department has to work in consonance with the administration, the legal department and the marketing department to ensure that GZRRC follows the highest standards of compliance.

Sl No	Name of Department	Role of Department
7	Safety and Security	The safety of visitors, animals and the staff is of utmost priority to GZRRC. Hence the security department of GZRRC is tasked with ensuring that the facility is protected from all natural and anthropogenic threats both internal and external. The security department of GZRRC is a stand alone unit that has its own infrastructure, which includes manpower as well as security infrastructure such as smart gates, smart id-cards, long-distance and short-distance two-way radio communications devices, CCTV cameras, Infra-red cameras, and other devices that ensure long-term safety of the facilities. The security team is also tasked with the execution of frequent mock drills to ensure that all GZRRC staff are aware of safety protocols
8	Procurement	The procurement department is tasked with all equipment acquisition, distribution for all departments of GZRRC. The equipment and materials can include all perishable and imperishable substances that are required for the maintenance and growth of GZRRC. The procurement department works closely with the accounts and other departments to ensure timely procurement of all essential materials required for the operation of GZRRC.
9	Human resources	The Human Resources department is tasked with the hiring of all staff pertaining to all job roles that are required at GZRRC. The HR department is the primary liaison between the staff and the administration. This involves communication of all management policies and code of conduct training to new and existing employees for the smooth operation of GZRRC. The HR is also responsible for addressing all issues pertaining to the redressal of employee grievances and providing adequate conflict-resolution solutions as per company guidelines and labour law codes. The human resources department works closely with all departments of GZRRC to ensure smooth operations.

Sl No	Name of Department	Role of Department
10	Information Technology Support	GZRRC is a smart zoo that has implemented a smart framework for zoo management across the entire organization structure. All employees at GZRRC has a digital presence and an employee dashboard that can be accessed from workstations as well mobile devices. The IT and support team works round the clock to ensure that the GZRRC online infrastructure is online at all times of the day throughout the year. The IT team is responsible for maintaining all software and hardware that is acquired or will be acquired for the daily operation of GZRRC. For hardware acquired under a comprehensive maintenance contract, the IT department acts as the primary liaison and point of contact for third-party suppliers

## Proposed organization structure

The proposed organization structure for the Greens Zoological, Rescue and Rehabilitation Centre is linear but nimble enough to allow interlinking of functions, activities, roles, and responsibilities. At the apex of this structure is the Head of the Project, under whom the Chief Executive Officer (CEO) shall be overlooking the entire management of the facility along with the Directors of the GZRRC. Under the CEO, the positions for employees are structured in various levels-

Support staff which may not require specialized training is generally outsourced. The organization structure proposed for the GZRRC is as follows:

The detailed manpower plan for the project has been prepared in accordance with CZA guidelines. It is proposed that the important positions shall be recruited at the beginning of the Project and subsequently manpower will be added as and when the projects move to execution and then operations phase. The complete team would be in place before the formal operations commence. The detailed manpower plan for the project is as follows:

Table 5.2: The detailed organization structure of GZRRC

Unit	Post	Number
<b>Head of the Facility</b>	Head of the Project	1
	Chief Executive Officer	1

<b>Unit</b>	<b>Post</b>	<b>Number</b>
	Director	1
	Assistant Director	1
	Executive Assistants	5
<b>Animal Management &amp; Records</b>		
	Lead Curator (General Curator)	1
	Curator – Mammals	1
	Curator – Primates	1
	Curator – Birds	1
	Curator – Reptiles	1
	Curator – Amphibian & Invertebrates	1
	Curator – Aquatics/Fishes	1
	Assistant Curator	15
	Head Keeper/Supervisor	15
	Keepers	400
<b>Animal Health &amp; Nutrition</b>		
	Lead Veterinary Officer	1
	Veterinary Officer – Medicine	3
	Veterinary Officer - Pathology	2
	Veterinary Officer – Surgery	2
	Veterinary Officer – Anaesthesia	1
	Veterinary Officer – Sonography	2
	Specialized Veterinary Officer – Aquatic	1
	Specialized Veterinary Officer - Avian	1
	Specialized Veterinary Officer- Animal Nutrition	2

<b>Unit</b>	<b>Post</b>	<b>Number</b>
	Specialized Veterinary Officer- Wild Rescue	1
	Specialized Veterinary Officer – Neo-Natal Care	2
	Lab Assistant	10
	Para Vet	10
	Compounders	10
<b>Rescue &amp; Rehabilitation</b>		
	Lead Rescue & Rehabilitation Supervisor	1
	Supervisor	1
	Keeper	10
<b>Conservation Breeding &amp; Research</b>		
	Lead – Conservation Breeding & Research	1
	Scientist – Population Management	2
	Scientist – Animal Behaviour & Enrichment	4
	Expert – Animal Welfare	1
	Expert – Positive Reinforcement Training	2
	Biologist	6
<b>Conservation Education</b>		
	Lead Education	1
	Education Officer	1
	Assistant Education Officer	1

<b>Unit</b>	<b>Post</b>	<b>Number</b>
	Designer	1
	Zoo Guides	10
<b>Forestry/Horticulture/Landscape</b>		
	Lead Forestry/Horticulture Expert	1
	Landscape Architect	1
	Supervisor	5
	Forester/Gardener	50
<b>Administration/Operations/Management/IT/Legal/PRO/Security/Marketing</b>		
	Administrative Officer	1
	Head Finance	1
	Head Operations	1
	Head Marketing	1
	Head IT	1
	Head Legal	1
	Head PRO	1
	Head Security	1
	Head Engineering	1
	MEP	3
	Support Staff to each Head as per the actual need	
<b>Legal Department</b>		
	Director (Compliance head)	1
	Compliance Coordinator	1
	Compliance Officer	2
	<b>Total</b>	<b>609</b>

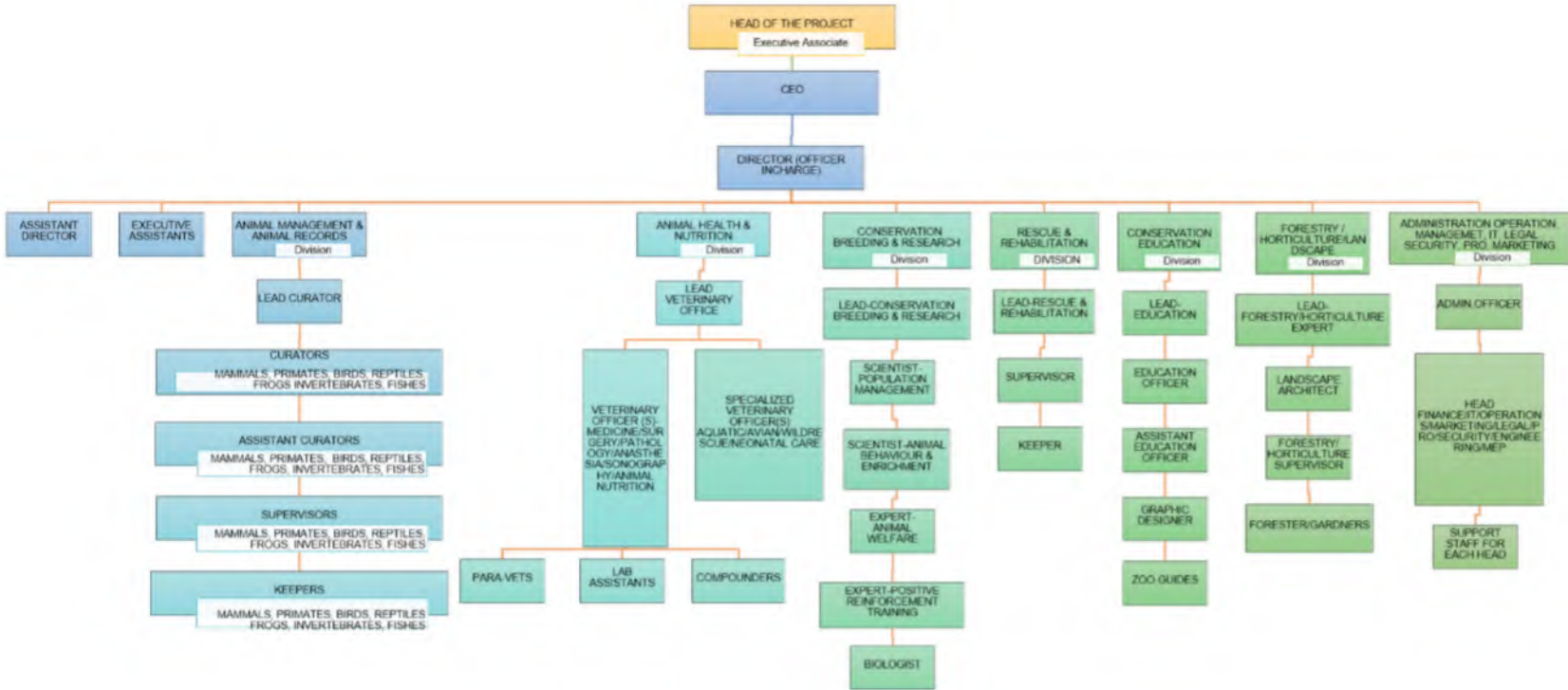


Figure 5.1: Organization structure of GZRRC

# 6 Disaster Management Policy

## Introduction

Disasters are defined as

“Situations or events, which overwhelm local capacity, necessitating a request to national or international level for external assistance.”

Therefore Disaster Management entails a continued and integrated process of planning, organizing, coordination and implementing measures which are necessary for-

1. Prevention of danger or threat of any disaster.
2. Mitigation or reduction of risk of any disasters or its severity or consequences.
3. Capacity-building.
4. Preparedness to deal with any threatening disaster-like situation or disasters.
5. Prompt response to any threatening disaster-like situation or disasters.
6. Assessing the severity or magnitude of effects of any Disasters.
7. Evacuation, rescue and relief.
8. Rehabilitation and rescue.

The Greens Zoological Rescue and Rehabilitation Center is spread over an area of 685.14 acres. The primary calamities that can affect the area are seasonal flood that is characteristic of the area during monsoons. The arid landscape that surrounds GZRRC is prime habitat for grasses and shrubs that pose significant risk of wildfire during summers. Some of the potential hazards to the GZRRC facilities are furnished below.

1. Fire
2. Flood
3. Thunderstorm
4. Law and Order
5. Building collapse
6. Visitor Management
7. IT System Failure/Cyberattack
8. Security of animals, zoo personnel and visitors

Every zoo, rescue center and conservation breeding facility should have a comprehensive disaster management and risk management plan that accounts for any exigent situation that may arise during the course of operation at the facility. A risk management plan is designed to account for major Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) is committed to offering a safe environment to visiting public, zoo staff and animals. Risk management is one of the most important aspect of zoo

management. A consistent and comprehensive site -specific risk management policy is crucial for the following reasons:

1. **Animal welfare:** A risk management policy should be designed to ensure that GZRRC is able to provide optimum husbandry practices that adhere to the highest animal welfare standards at all times. The animal welfare management policy at GZRRC accounts for all contingencies during exigencies to ensure that the welfare standards are not compromised.
2. **Staff safety:** GZRRC is a primary stakeholder in all policy considerations. Therefore the risk management policy focuses on the health and safety of staff. The first step of a risk management policy is to identify at-risk staff and identifying the type and level of risk-exposure of the concerned staff.
3. **Public health and safety:** At GZRRC public health and safety is of utmost importance. The risk management plan of GZRRC has strict public and health management policies to mitigate the risk of public injury due to close interaction with animals. Biosecurity and the risk of spread of zoonotic diseases is also addressed by following strict management protocols.
4. **Conservation breeding:** GZRRC is involved in the management of several species that are endangered in the wild. Therefore the risk management practices should account for exigencies that may affect the health, welfare and long term viability of the endangered species.
5. **Health and safety of first responders:** GZRRC emphasizes the health and safety of all staff identified as first responders. The risk management policy prioritizes the identification of first responders and training the same to the highest standards.
6. **Disaster management:** The risk management policy of GZRRC has identified the threats and weaknesses of its facility, infrastructure and staff in the case of natural disasters. GZRRC strives to provide a robust disaster management plan that ensures the health and safety of all stakeholders viz., animals, staff and visitors.

GZRRC has developed the following risk management plan for effective day to day running of the zoo in a safe manner.

## Disaster Management Team

A disaster management team is a crucial to the effectiveness of a disaster management plan. GZRRC has a designated disaster management team that is always on standby to handle and manage exigencies. The GZRRC disaster management team is trained on the zoo topography, the collection plan, layout of the facility and the designated contact person for each department.

## Fire Control

Due to the unique location of GZRRC, fire prevention is of utmost importance. Fire hazards such as dry leaves, litter are regularly cleaned from the premises and take off-site for safe disposition. The GZRRC management staff are trained on fire management SOPs to handle any exigencies.

GZRRC ensures that all buildings in its facility has a robust fire response protocol complemented by a adequate fire control equipment. All areas falling within the GZRRC are well covered by fire hydrants. All enclosures are furnished with wide roads to ensure ease of access to fire trucks. All staff members at GZRRC are trained on basic fire handling protocols to control small fires within the fastest response time. Logs are maintained to ensure that fire-risk at all areas of GZRRC are identified and addressed. Fire drills are carried out regularly to ensure that the staff are conversant with the fire-management policy and all the fire-management equipment are in working condition.

The emergency contact numbers of fire brigade units in and around the facility are prominently displayed at all strategic points of GZRRC buildings fire crew station for handling any fire related emergencies. Contact numbers of fire brigade units of the state government and industries stationed in and around GZRRC are displayed at strategic locations inside all buildings.

## Flood and Cyclone

GZRRC aim to provide a safe captive environment for all animals under its care. GZRRC is also duty-bound to provide a safe work environment for all its staff.

The coastal location of GZRRC makes it especially susceptible to inclement weather conditions such as periodic heavy thunderstorms, cyclones and flooding. GZRRC is designed and landscaped to be on higher ground compared to the surrounding areas hence its natural aspect protects it from seasonal flooding due to heavy rainfall. Swales have been created inside and around GZRRC to ensure protection from any damages due to flooding. The enclosures and buildings at GZRRC is designed to provide a thermally stable environment to all animals housed within its premises. All enclosures are built on a higher elevation and well-planned swales have been created throughout the site to negate any occurrence of flood. Though the area of GZRRC is prone to Cyclones and thunderstorms, the night shelter in all the enclosures will be constructed in such a way so that they provide protection to the in-house animals against all extreme weather conditions.

## Security infrastructure

GZRRC recognizes the importance of an efficient security infrastructure that can service its unique security requirement. GZRRC has an advanced security infrastructure that ensures round-the-clock security to the facility. The security framework at GZRRC consists of the following three components:

- The security policy of GZRRC.

- The security infrastructure of GZRRC.
- The staff involved in the implementation of the security policy.

Proactive efforts have been taken to address any law-and-order issue within the GZRRC premises. Security personnel are posted at strategic locations while remote areas are constantly monitored using CCTV cameras. The phone numbers of the nearest police stations to GZRRC, Animal Management staff number, Fire brigade number, ambulance number, nearest hospital number will be displayed at important points. All animal keepers, sweepers, security personnel's and forest staff could be trained in handling of law-and-order situation and regular mock drill will be conducted with the police department.

### **Law & Order**

Law and order breakdown is a major area of concern for any establishment involving a high number of visitor's in a particular day. Proactive efforts will be taken to address any law and order issue within the GZRRC premises. This can be done by placing staff at strategic locations and doing surveillance using CCTV Cameras. The phone numbers of the nearest police stations to GZRRC, Animal Management staff number, Fire brigade number, ambulance number, nearest hospital number will be displayed at important points. All animal keepers, sweepers, security personnel's and forest staff could be trained in handling of law and order situation and regular mock drill will be conducted with the police department.

### **Visitor safety and health**

Any visitor who gets injured will be given first-aid at GZRRC. Enclosures will be provided with stand of barrier with hedges in between the railing and boundary wall of the enclosures. The staff of the GZRRC will monitor and prohibit attempts of visitors to reach very close to the enclosures. In case of serious injury to any staff member or visitor they will be immediately rushed to the nearby hospital. Each enclosure shall maintain items like foldable ladders, horns, first aid, etc. to respond to emergencies as per the guidelines published by CZA. All safety provisions will be made in each enclosure so that the visitors don't get too close to the animals. Still in case of any emergency such as falling of visitors inside the enclosures, alarm bell will be sounded, and the emergency team would rush to the spot. The area around the enclosures would be vacated by the security staff to reduce the panic caused by onlookers. The animal keepers of that animal accompanied with other animal keepers and veterinary staff would take the animal to night shelter while the remaining staff would Rescue the visitor. The whole line of command as individual role for each member of the team would be defined beforehand and regular mock drill would be conducted to practice such emergency situations.

## Fighting among animals

Since GZRRC often rescues animals from other facilities and houses them in quarantine facilities, there is a high probability that in-fighting can commence between incompatible enclosure mates. Therefore, GZRRC has a robust policy of checking the compatibility of unrelated individuals prior to placing them in the same enclosure. Animal keepers at GZRRC are trained to identify and report inconsistencies in animal behaviour patterns such as increase in stereotypy, avoidance of conspecifics and reduction in food consumption. These early detection techniques of conflict identification help reduce chances of injury and mortality of animals due to conflict. GZRRC veterinarians have developed a standard operating protocol to break up a conflict inside the enclosure. GZRRC uses water hoses, sirens and voice commands as passive methods as means of conflict resolution. On the other hand, in case of vicious conflicts emergency response teams are trained to tranquilize fighting animals and control the same without risking injury to any staff. The staff also maintain a log of such incidences and utmost care is taken to house conflicting individuals at separate enclosures.

## Power supply

GZRRC has a comprehensive power backup system that works in tandem with the power grid of the facility. Each site and section falling within GZRRC has its own power supply unit with backup generators that can run all the essential facilities within the facility until the resumption of normal power supply. The vital infrastructure like water-treatment/circulation system, Heating Ventilation and Air Conditioning System (HVAC) are linked with constant power backup systems. All security systems installed at GZRRC are also linked to centralized power backup systems that have failsafe to ensure the safety and security of the staff at all times.

## IT System Failure and Cybersecurity

GZRRC aims to provide a secure facility to foster the tenets of conservation-oriented animal management. To achieve the said objectives, GZRRC has a robust security system that includes guard posts, security checkpoints as well as a strong cyber-security framework. All personnel working with and near animal enclosures, have valid identification cards that are vetted and issued periodically. Highly sensitive areas are accessible only to personnel with the appropriate training, qualifications, and clearances to ensure that the security of animals and personnel is never compromised. GZRRC conducts record keeping and animal management through a secure online software platform. The Information technology team at GZRRC has implemented a secure internal network that protects sensitive data from being breached by cyber attackers. All staff members at GZRRC are trained and sensitized to the importance of data security. Regular training drills are conducted to ensure that new staff members are updated about GZRRC IT-security policy and existing staff-members are regularly updated about the importance of the same.

## **Security of Animals, Visitors and Emergency Protocols**

GZRRC is committed to providing a safe environment for all three stakeholder present at the facility viz., animals, visitors, zoo-staff. Based on the same, GZRRC has formulated a security policy for the animals, visitors and zoo-staff, which is explained below.

### **Wild animal rescue and rehabilitation**

GZRRC is committed to the health and safety of all wild animals included in its collection plan. GZRRC has partnered with several government and non-government institutions to conduct the rescue and rehabilitation of welfare compromised animals in the past. GZRRC has set up a multi-specialty hospital that can provide round the clock diagnostics and medical care to the animals housed in its facility. The in-house medical facility at GZRRC will be an asset for other partnering zoos and government institutions for the training, upskilling of veterinarians and the treatment of animals. The GZRRC will act as a center for treatment and safe upkeep of rescued wild animals especially from urban and populated areas to reduce incidents of man- animal conflict. The pressure on wildlife rescue is tremendous in the region and as a result a composite Rescue Centre shall be established to house rescued animals. The GZRRC will also act as an orphanage for the young orphaned wild animals. Rescued wild animals from locals, forest department, zoos, etc., will also be rehabilitated at the GZRRC subject to the animal collection policy of the facility. The GZRRC rescue center can also serve as a transit/rescue center for diseased and injured animals rescued from the nearby areas after seeking permission from the concerned authority of the state.

### **Escape of animals from the enclosure**

At GZRRC animal enclosures are designed as per the guidelines of Central Zoo Authority to prevent the escape of animals. Enclosure design concepts at GZRRC ensures the safety of visitors, staff and animals. A tranquilizing gun with all accessories and the desired medicines will always be on standby at the veterinary facility in the GZRRC premises. Updated body weights and dosage recommendations for each individual animal is available to all veterinary staff at the facility to aid in prompt response. GZRRC staff will be trained in tranquilizing and capture the escaped animals. Due care will be taken so that no animal escapes from the enclosures. Installation of alarm systems throughout the zoo and rescue center campus will be done for alarming the visitors and staff in case of any such problem.

### **Snake-bite treatment**

GZRRC maintains a repository of adequate anti-venom serum and other first-aid facilities as remedial measure to snakebites to staff members and visitors. During the rainy season staff members are provisioned with gumboots and undergo mandatory training to ensure they follow all safety protocols

while caring for venomous animals. GZRRC also maintains strategic partnerships with local health-care providers along with an in-house ambulance facility that is equipped to treat and stabilize patients in need of emergency medical aid.

## Vermin management

GZRRC has a mandate to provide a safe and disease-free environment to its animals and the staff-members. Several unwanted animal species are commonly found at zoos that can pose serious risk of transmission of zoonotic diseases to the myriad collection of animals at GZRRC and the staff taking care of them.

Some of the commonly occurring pests in Indian zoos include macaques, langurs, dogs, mongooses, rats and bats. GZRRC has a strict vermin control policy that regularly sanitizes enclosures and surrounding areas, while checking for evidences of pest movement. In most cases, pests are attracted to the food present within and outside enclosures. Therefore, GZRRC staff ensures that all vermins and pests in and around the area are controlled regularly. Designated pest management teams ensure that there is periodic maintenance in and around the facility. GZRRC has an effective Solid Waste Disposal and Management plan that aims to reduce the resource access of pests and hence controls their population naturally. The GZRRC staff is regularly trained and sensitized to the important tenets of the SWDM. GZRRC has a strict security policy that prevents feral dogs from entering the premises. Periodic capture and offsite removal of dogs and other feral animals is carried out at the facility. GZRRC has implemented robust bio-security policies to prevent pests and predators from entering the facility. A perimeter fence of 8meters with overhangs and power fencing protects the facility from unwanted incursions.

## Food Supply Management

GZRRC houses several indigenous and exotic species of wild fauna in its facility that have unique husbandry and welfare requirement. The unique dietary and welfare requirement of some species creates a logistical challenge to acquire and stock food products that are essential for the maintenance of species-typical behaviour patterns in housed animals. GZRRC has Memorandum of Understanding (MoU) with several partner organizations for the regular and emergency acquisition of food resources. This ensures that GZRRC receives an uninterrupted supply of food material required for the husbandry and upkeep of the animals in its inventory.

GZRRC follows stringent safety protocols to ensure that the food supplies received from suppliers are passed through stringent quality control checks before they are distributed to the animal enclosure for consumption. GZRRC also maintains ten days of non-perishable grains and other rations in its off-site facilities to ensure uninterrupted supply of food. GZRRC plans to produce green fodder in-house for the herbivores housed in this facility, which will serve as a buffer stock during emergencies. Linkages with multiple feed supply contractors from Jamnagar and various other places in the Gujarat state will be established to address unforeseen stoppages in food supply.

## **Epidemics**

GZRRC is designed to prevent the spread of epidemics at the facility. The Spread of an epidemic disease at any zoo is a cause of concern for animal facility managers and veterinarians and animals. Contrary to the wild, disease outbreak is very difficult to control at zoos, and rescue centers since animals live in close proximities. At GZRRC, animal facility managers and veterinarians work together to contain the spread of disease. Disease prevention is the crucial first step to at GZRRC that guides our disease prevention policies. GZRRC has established necessary sanitary practices, vaccination schedule, and quarantine and disinfectants protocols as a part of disease prevention policy. All animal handlers are regularly trained and sensitized on the disease prevention policies of GZRRC.

## **Safety team and first responders**

The effectiveness of any risk-management policy depends on the efficiency and training of the staff who are tasked to execute the policy. GZRRC risk management policy attempts to identify plausible risks to the health and safety of all stakeholders at the institution while also creating safety teams that can handle each risk. GZRRC risk management policy attempts to delineate a group of first responders who are trained to handle a specific group of risks. Based on the level of the risk, or the emergency safety teams can request additional help from adjacent support teams. Safety teams are trained to identify and respond to exigencies within the shortest possible time to ensure early mitigation of all possible threats.

## **7 Contingency Plan**

### **Animal Rescued from Wild:**

The Greens Zoological, Rescue and Rehabilitation Centre will act as a center for treatment and safe up keep of rescued wild animals especially from urban and populated areas to reduce incidents of man- animal conflict. The pressure on wildlife rescue is tremendous in the region and as a result a composite Rescue Centre shall be established to house rescued animals.

The Greens Zoological, Rescue and Rehabilitation Centre will also act as an orphanage for the young orphaned wild animals. Rescued wild animals from private owners, forest department, zoos, etc., will also be rehabilitated at the Greens Zoological, Rescue and Rehabilitation Centre for their well being. For treatment of such rescued animals as well as in-house animals, veterinary facilities will be created at the Greens Zoological, Rescue and Rehabilitation Centre premises. Thus, this rescue center could be designed to act as a transit/rescue center for problematic and injured animals rescued from the nearby areas after seeking permission from the concerned authority of the state.

### **Escape of animals from the enclosure:**

Animal enclosures would be designed as per the guidelines of Central Zoo Authority to avoid escape of animals from the rescue center premises or their enclosures. A tranquilizing gun with all accessories and the desired medicines will always be on standby at the veterinary facility in the Greens Zoological, Rescue and Rehabilitation Centre premises. Greens Zoological, Rescue and Rehabilitation Centre staff will be trained in tranquilizing and capture the escaped animals. Due care will be taken so that no animal escapes from the enclosures. Installation of alarm systems throughout the zoo and rescue center campus will be done for alerting the visitors and staff in case of any such problem.

### **Monkey and feral dog menace:**

Monkeys and feral dogs are a cause of concern for both public and wildlife since they create nuisance and may harbor diseases that may be harmful to visitors and inmates at the zoo. Hence all efforts will be taken to control this menace completely. Monkeys and dogs are mainly attracted to the solid waste generated by the visitors and the leftover food carelessly disposed by the animal keepers. Hence an effective Solid Waste Disposal Management plan (SWDM) would be executed with in the rescue center premises and surrounding areas. The rescue center staff will be made aware about SWDM through regular training and signage. Monkeys proof dustbins would be provided at all strategic points. Regular security at all the security points would ensure that no stray dogs enter the premises.

The perimeter wall at all the points would be built at least 2 meters high and would preferably be fixed with power fencing.

### **Arrangement of food in case of strike (non-supply by contractor):**

In case of strike of non-supply by the contractor(s), the animal feed will be purchased from the local market and other place by the management. A plan in this regard will be in place.

### **Snake bite:**

Anti venom and other first aid facilities would be maintained at all the times to deal with any case of snake bite to any staff member or visitor. During rainy season, gumboots will be provided to care takers who are working in the enclosures as a safety precaution. The “Greens Zoological, Rescue and Rehabilitation Centre” shall provide emergency ward for any such emergencies. Local government hospital will be kept on high alert to respond to any SOS call from the rescue center in case of emergency.

### **Visitors getting injured/visitors falling inside the enclosures:**

Any visitor who gets injured will be given first aid at Greens Zoological, Rescue and Rehabilitation Centre. Enclosures will be provided with stand of barrier with hedges in between the railing and boundary wall of the enclosures. The staff of the Greens Zoological, Rescue and Rehabilitation Centre will monitor and prevent attempts of visitors to breach enclosure standoff barriers. In case of serious injury to any staff member or visitor they will be immediately rushed to the nearby hospital. Each enclosure shall maintain items like foldable ladders, horns, first aid, etc. to respond to emergencies as per the guidelines published by CZA.

All safety provisions will be made in each enclosure so that the visitors don't get too close to the animals. Still in case of any emergency such as falling of visitors inside the enclosures, alarm bell will be sounded, and the emergency team would rush to the spot. The area around the enclosures would be vacated by the security staff to reduce the panic caused by onlookers. The animal keepers of that animal accompanied with other animal keepers and veterinary staff would take the animal to night shelter while the remaining staff would Rescue the visitor. The whole line of command as individual role for each member of the team would be defined beforehand and regular mock drill would be conducted to practice such emergency situations.

## **Fighting among animals:**

Agonistic interactions between conspecifics housed at the same enclosure is a common occurrence across several zoos and rescue centres. GZRRC has developed a standard operating protocol to prevent infighting between animals housed at its facilities. Initially, the animal handler of that enclosure would try to lead the fighting animals to different part of the enclosures, without entering the enclosure. However, if this doesn't solve the problem an emergency team would get to action. The animal handler along with team staff would physically try to stop fighting by entering the enclosures and separating the fighting animals. However, in case of large herbivores and carnivores use of water jet or sound would be made to deal with the situation but fighting gets to the dangerous levels, threatening the life of the any animal or risk of serious injury, use of sedatives or tranquilizers would be made under the guidance of the rescue center veterinarian.

## **Epidemics:**

Spread of an epidemic disease at any zoo is a cause of concern for animal facility managers and veterinarians and animals. Greens Zoological, Rescue and Rehabilitation Centre will also be prone to such outbreaks like any other captive centres. Any major disease outbreak is very difficult to control because unlike wild, in rescue center the animals live in close proximity enhancing the risk of disease spread to very high levels. Animal facility managers and veterinarians will work hand-in-hand to contain the spread of disease. Working on the tenet of prevention is better than cure. Necessary sanitary practices, vaccination schedule, and quarantine and disinfectants protocols will be observed. Handler will be properly sterilized to avoid contamination and transmission of disease.

## **Breakdown of power supply:**

Silent generators are installed at all GZRRC facilities to provide emergency power backup. GZRRC is working towards a green future by moving towards renewable sources for its energy requirement. In the future, GZRRC facilities will be grid independent and generate enough electricity to meet its annual power requirement. GZRRC is also involved with several other green initiatives to reduce its carbon footprint. The green policies of GZRRC have been implemented across all departments, so that the facility works towards the common goal.



## **8 Capacity Building Policy of Greens Zoological Rescue and Rehabilitation Centre**

For a modern zoological collection to function on par with global standards and provide a high level of care for its animals, having skilled and knowledgeable staff across all verticals is a top priority. Greens Zoological Rescue and Rehabilitation Centre will ensure that all staff members are constantly up-skilled and trained at par with the highest industry standards in order to help achieve the mission and vision goals of the institution. GZRRC will strive to maintain and surpass these standards and ensure that all members of staff are provided with the environment and opportunities to remain at the cutting edge in their specific fields. Zoo management, animal care, veterinary, education and other staff will be expected to regularly take up these opportunities to upgrade their skills and showcase the work being done here. The GZRRC will develop and maintain a comprehensive library with a comprehensive catalog of books and journal subscriptions to a wide range of scientific, educational and veterinary journals to ensure that staff have access to the latest publications. GZRRC will also empower the veterinary and animal research teams to collaborate and publish cutting-edge research related to the conservation biology, zoo management and animal welfare to take these disciplines forward.

### **Animal care and veterinary expertise**

GZRRC veterinary team is tasked with the maintenance of all animals under its care. Caring for rescued animals is a challenging task for all veterinarians. Hence, the training and skill up-gradation of the officers/staff engaged in the rescue center management will remain a thrust area of planning. The staff needs to be trained in various aspects of animal safekeeping and interaction with animals. GZRRC veterinarian team has over 50 members that includes 18 veterinarians and 30 support staffers including para vets and laboratory technicians. Apart from building the necessary infrastructure for the prophylactic and therapeutic treatment of animals, GZRRC will continue to invest in the capacity building of its staff-members. The staff members trained at international agencies will become educators for other staff members and organized in-house capacity-building workshops. Animal welfare is an emerging concept that requires further research to unravel its different facets. The GZRRC animal care and research team will work closely with each other for inter-departmental collaboration to ensure that everyone is working towards the goal of achieving GZRRC mission policy.

### **Public education**

One major aim of the Greens Zoological, Rescue and Rehabilitation Centre is to develop conservation awareness among the public, especially the children. Hence the Greens Zoological, Rescue and

Rehabilitation Centre staff needs to have knowledge to fulfill the aspiration and inquisitiveness of the visitors. One of the major responsibilities of the staff would be to create an appropriate atmosphere for the visitors to enjoy the ambience of the Greens Zoological, Rescue and Rehabilitation Centre shall take due care of the animals and their welfare.

### **Research and conservation**

Research and conservation is one of the key mission goals of GZRRC. The research and analytics department of GZRRC will identify gaps in our understanding of species biology and conservation best practices and conduct research for filling these gaps. GZRRC will conduct research on the *ex-situ* and *in-situ* aspects of conservation and biology of species under its care. The research and analytics team will not only conduct multi-disciplinary research for the conservation of species, they will also ensure that GZRRC is compliant on all facets of zoo management. Hence, they must be aware about various Acts, Rules and Regulation & mode to implement them. The GZRRC research and analytics team will be allowed to conduct visits to find out the best practices adopted at various similar rescue centers and in the state as well as country.

### **Animal handling and management**

Animal handling and management is one of the core activities practiced at Greens Zoological Rescue and Rehabilitation Centre. The animal care staff at GZRRC are being constantly trained and upskilled on the various aspects of animal handling and management practices. Rather than focusing primarily on the best practices of animal management, trainers will also teach about things to avoid specific to each species in the GZRRC collection plan. The crux of all animal handling and management training will be based on hands-on approaches and one-to-one training. The keepers of GZRRC will also collaborate with animal behaviour trainers, who will help them train animals on basic and advanced management

### **Available training programmes for zoo professionals**

There are several training programmes available for aspiring and on-the-job zoo professionals. These training programmes are available for all GZRRC professionals.

A non-exhaustive listing of such potential opportunities are as follows :

1. Training programs offered by the Central Zoo Authority (CZA) and Wildlife Institute of India (WII).
2. Programs offered by the Durrell Wildlife Conservation Trust.

3. Programs offered by the Smithsonian Conservation Biology Institute.
4. Conferences, Workshops, Seminars/Webinars organized by WAZA.
5. Conferences, Workshops, Seminars/Webinars organized by IZE.
6. Veterinary workshops and conferences focusing on healthcare management of various taxa.
7. Animal Care workshops and conferences focusing on captive management, biology, enrichment and propagation of various taxa.

## **Additional training partnerships available to GZRRC staff**

- GZRRC will seek membership in national and international zoological bodies such as the World Association of Zoos and Aquariums (WAZA), European Association of Zoos and Aquariums (EAZA) and the International Zoo Educators Association (IZEA), International Union for Conservation of Nature and Natural Resources (IUCN).
- Staff in their individual capacities will be expected to seek membership in various specialized bodies, such as the International Union for Conservation (IUCN-SSC) taxa specialist groups and task forces.
- In house modules will be designed for education and skill building of zoo staff and implemented periodically, with the help of external expertise where necessary. Regular assessment and documentation of staff knowledge and skills will be carried out as a part of the Human Resources Management (HRM) policy.
- The GZRRC will execute MoUs with national and international zoos, educational institutions and Veterinary institutions to facilitate animal exchanges, staff placement and development programs.

Specialized training and internships will be provided for students from zoology, wildlife science and veterinary backgrounds who are interested in building their skills in scientific management of captive wildlife. At present the GZRRC has signed MoU with the following Indian Zoos and Institutions:

1. National Zoological Park, New Delhi.
2. Assam State Zoo cum Botanical Garden, Guwahati, Assam.
3. Centre for Herpetology, Madras Crocodile Bank Trust, Mamallapuram, Tamil Nadu.
4. Lt. Labhuben Ranchhoddas Barchha Charitable Trust.
5. Sardar Patel Zoological Park, Kevadia, Gujarat.
6. Nagaland Zoological Park, Rangapahar, Nagaland.

## Way forward

GZRRC will hold national and international conferences and training workshops that will not only aim to upskill its staff members but also provide similar opportunities to other zoo professionals. GZRRC is focused on building the capacity for zoo management and around the world, to ensure that biodiversity conservation is linked with the “One-plan approach”. GZRRC will become a torchbearer for capacity building all across the world and provide opportunities to empower zoo professionals. Trained GZRRC staff will become experts in their respective fields and help develop the capacity and fulfill the training potential of new recruits. Over the course of time GZRRC will become a nodal agency for the capacity building of zoo professionals from around the world.

## 9 E-Governance

The GZRRC is committed to the Government of India's vision on the 'Digital India programme' which aims to transform India into a digitally empowered society and knowledge economy. E-Governance requires top management of GZRRC to direct and influence what is happening on the ground. To effectively govern GZRRC, leadership need to know about the issues, incidents and accidents, what remedial action has been taken and whether that was sufficient. One of the most efficient and effective ways to understand what is happening and when is to bring all management systems together. At GZRRC, we will implement an integrated information management system so that there is transparency, visibility, traceability, and cross-departmental collaboration. Apart from information GZRRC requires to document policies, procedures and processes to set expectations, establish roles and responsibilities, and communicate commitments. Every document then needs to be controlled and managed, and there needs to be evidence that employees have read, understood or rejected the policy. GZRRC will create a Content Management System that seamlessly integrates document management, processing, and accessing documents electronically across departments. This system will help various GZRRC departments interact with other departments so that they are aligned with what the vision and mission of GZZRC.

The information and documents will follow certain standard to ensure quality, efficiency, reliability and interchangeability at economical cost. Standards are means to share ideas and to establish a common understanding on a given subject for all stakeholders, which eventually helps in minimizing communication gaps and building low cost solutions. Our internal audit module that is in the process of creation will enable employees to log risks, incidents and vulnerabilities from any device across departments and sites. Notifications and workflows will then be started, and the status can always be traced. This is an essential tool for leadership teams to quickly understand any potential threats. Investing in a routine internal audit module helps not only identify issues and vulnerabilities, it provides an opportunity to take the temperature of the corporate culture. All data will be stored securely in the cloud and can be accessed real-time online and with mobile platforms.

Modern zoos need to have information management systems that facilitate zoo management and optimize processes. There are several zoo collection management software that provide a multi-point access system linked with a central sophisticated database management system that aids in report generation and efficient management. The Tracks software system has been implemented sitewide at GZRRC to aid in data entry and management for better zoo-keeping across GZRRC. GZRRC is committed to making its database accessible to all personnel viz., zoo keepers, biologists, veterinarians, curators and senior management to aid in animal management, husbandry, treatment and welfare of all animals under its care. The tracks software is vital for the smooth operation of the animal management services at GZRRC. Using TRACKS, GZRRC management staff can print inventory reports, manage individual animal records, monitor treatments and welfare parameters along with breeding recommendations based on pedigree management of animals.



Figure 9.1: GZRRC Team being trained on TRACKS Software





## 10 Construction and Development Plans of GZRRC

The Greens Zoological Rescue, and Rehabilitation Centre, Jamnagar master plan is designed to be a future-facing document that outlines the plan for the development of the facility based on its vision plan. All financial support required for the development of GZRRC will be provided by the Reliance Industries Limited. Since the zoo is yet to develop, most of the budget is spent on construction activities. Once the facility is operational, GZRRC will be able to furnish a detailed budgetary analysis along with its future plan for sustainable economic growth.

### Construction and Development

Budget will be drawn annually for the GZRRC. The important work heads for which budgetary support will be provided are enlisted below.

Table 10.1: Major Budget Heads of GZRRC

Sl No	Work Head	Source of Budget
1	Construction of perimeter wall	Reliance Industries Ltd.
2	Construction of Rescue Centres	Reliance Industries Ltd.
3	Construction of Zoological Park	Reliance Industries Ltd.
4	Arrangement of Potable water, water supply and distribution	Reliance Industries Ltd.

### Daily Maintenance

Table 10.2: Daily Maintenance Budget of GZRRC

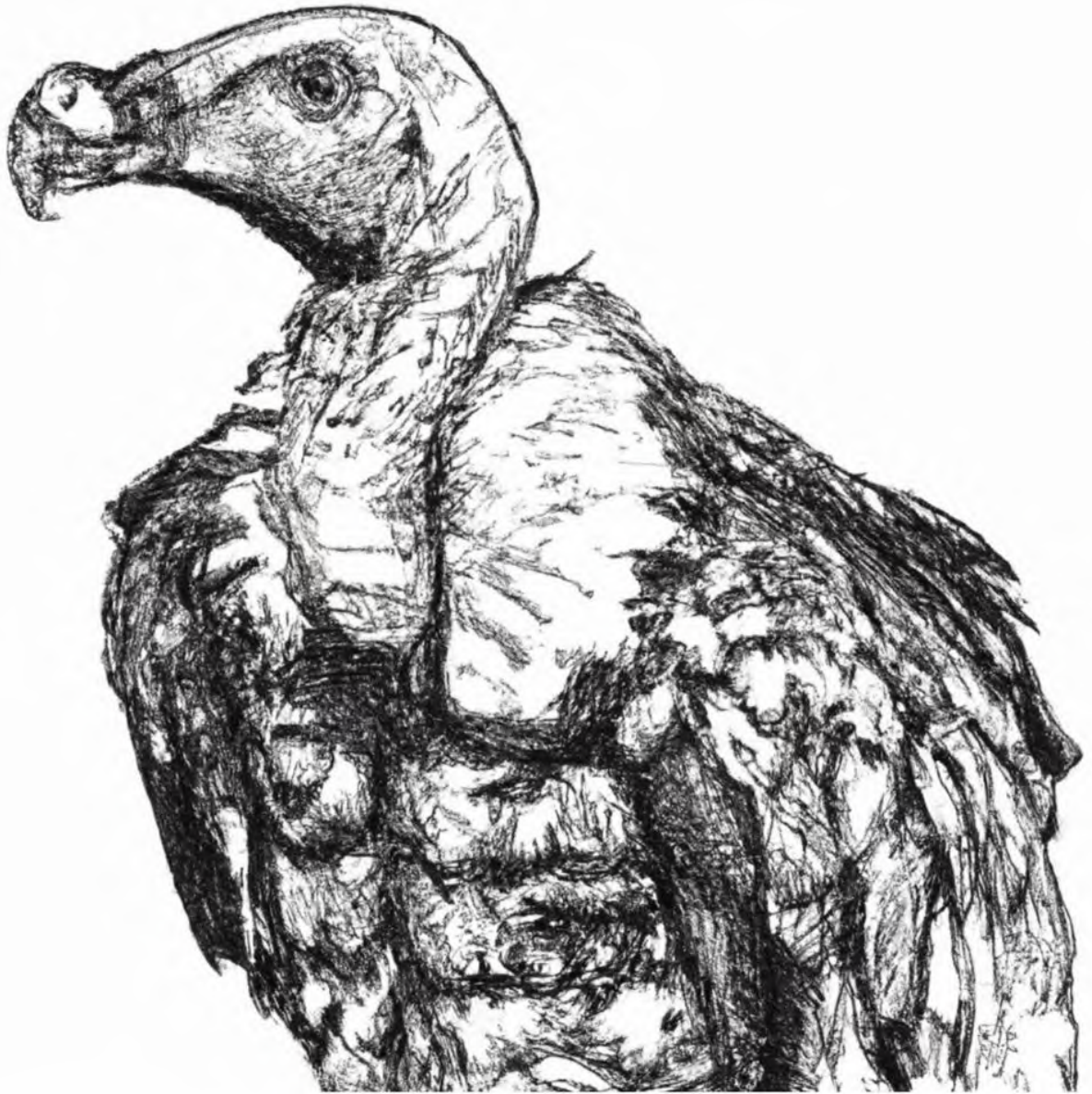
Sl No	Work Head	Source of Budget
1.	Animal Feed	Reliance Industries Ltd.
2.	Veterinary Medicine	Reliance Industries Ltd.

Sl No	Work Head	Source of Budget
3.	Expenses related to electricity, water, telephone, internet	Reliance Industries Ltd.
4.	Tools and materials	Reliance Industries Ltd.
5.	Wages for staff	Reliance Industries Ltd.
6.	Field and Vehicle	Reliance Industries Ltd.
7.	Repair and maintenance of buildings, enclosures, perimeter wall, visitors path, service road, electricity, water supply, signanes and others	Reliance Industries Ltd.
8.	Miscellaneous expenses/ day-to-day purchases	Reliance Industries Ltd.





## Part-III





# 11 Management Plan

The management plan for Greens Zoological, Rescue and Rehabilitation Centre is a dynamic document that is shaped to meet the goals of the master plan for the organization. The management plan lists out all the activities that have been identified based on the incumbent and future requirement of the organization. This management plan also provides a long-term and short-term overview of the activities that will be undertaken to execute various aspects of the master plan to ensure its fulfilment. The management plan also lists yearly and quarterly review frameworks for each of the proposed activity under the ambit of the master plan. The primary aim of the management plan is to provide a reliable document that lists for the existing and future employees of GZRRC the long-term and short-term goals for the organization and how to achieve the same.

The management plan of the Greens Zoological, Rescue and Rehabilitation Centre enlists the activities to be taken up for implementing the master plan for next years indicating realistic costs of executing the identified activities and financial year wise targets including anticipated sources of funding. The works to be carried out in phased manner is shown in tabular form year wise. It will be a working document that will guide the management team of the GZRRC for the management plan period and facilitate the budgeting and focused development. This will help the management of the facility to carry out development without disruption. If for some reasons whatsoever the budget is not available for certain work in that financial year, then that budget will shift to the next financial year.

This would include the maintenance of existing infrastructure, upkeep of animals, development of various facilities, greenery and other amenities, development of animal housing facilities and veterinary facilities etc. This cost would also include cost of purchase of equipment for operationalization of the facility such as vehicles, office equipment and furniture, store equipment, etc. fund requirement for this purpose is as under:

## Mission and Vision

The Greens Zoological, Rescue and Rehabilitation Centre has been at the forefront of animal care, rescue and management and hopes to strengthen its core competencies while venturing into other facets of global biodiversity conservation by interlinking its operations with that of its collaborative partners in conservation.

## Master Layout Plan

The Greens Zoological, Rescue and Rehabilitation Centre has developed and received approval for the Master layout Plan. As the Zoo develops, plans will be submitted and approvals requested through the due processes specified by the Central Zoo Authority as per the exigent need of the facility and the availability of funds.

## **Animal Collection Plan**

The animal collection plan of GZRRC has been developed and is elaborated in the master plan. The animal collection plan for the zoo has a good mixture of Indian and exotic species and native fauna that can aid in fulfilling the vision and mission of the zoo for conservation and raising awareness among the masses. The animal collection plan is designed to utilize the captive management and veterinary infrastructure developed by GZRRC to provide the best care to animals. The collection plan embodies GZRRC's commitment to animal welfare, conservation science and captive animal management.

## **Enclosure Construction**

Enclosure design is critical to the health and welfare of captive animals. At GZRRC, enclosure design and construction is led by a team of subject matter experts, architects, structural engineers and civil engineers, who ensure that each enclosure is designed to meet the highest safety standards without compromising the health and welfare of the animals housed in them. Enclosure construction, design and renovation is preceded by planning and approval processes. Detailed plans are developed based on the discussions and review process frameworks developed by the in-house enclosure design committee. Enclosure construction is followed by a thorough safety inspection, before animals are released inside the enclosure. The enclosure design, construction, management and renovation is an integral part of the management plan of GZRRC.

## **Design and Development of New Enclosures**

Greens Zoological Rescue and Rehabilitation Centre has created the finest infrastructure for the scientific management of animals in captivity and remains committed to providing exceptional care for its animal residents. This plan outlines a comprehensive strategy for designing and renovating animal enclosures to ensure they meet the highest standards of animal welfare, promote natural behaviours, and enhance the visitor experience.

## **Goals**

1. Design and renovate enclosures that prioritize the physical and psychological well-being of animals.
2. Create naturalistic habitats that encourage species-specific behaviours and minimize stress.
3. Ensure enclosures are functional, safe, and secure for both animals and staff.
4. Provide opportunities for public education and visitor engagement with animal enrichment and conservation efforts.

## Enclosure Design Principles

1. Species-specific needs: Each enclosure will be designed to accommodate the specific behavioural, social, and environmental requirements of the resident animals.
2. Animal welfare: Enclosures will provide ample space for movement, hiding spots, enrichment opportunities, and protection from the elements.
3. Safety and security: Enclosures will be constructed with secure barriers and designed to minimize escape risks and injuries for both animals and staff.
4. Sustainability: Sustainable materials and practices will be prioritized during construction and renovation projects.
5. Aesthetics and visitor experience: Enclosures will be visually appealing and informative, promoting visitor connection with the animals and their conservation needs.

## Management Process

1. Needs Assessment: Regularly evaluate existing enclosures to identify areas for improvement based on animal behaviour, welfare standards, and visitor engagement.
2. Project Planning: Develop detailed plans for each enclosure design or renovation project, including:
  - a. Animal species and their specific requirements.
  - b. Enrichment features and opportunities.
  - c. Material selection and construction methods.
  - d. Budget and timeline considerations.
  - e. Expert Consultation: Involve zoo veterinarians, subject matter experts, designers, and construction professionals throughout the planning and execution phases.
  - f. Regulatory Compliance: Ensure all enclosure designs adhere to relevant animal welfare regulations and guidelines established by governing bodies.
  - g. Construction and Maintenance: Implement construction and renovation projects with minimal disruption to animals and prioritize ongoing maintenance to ensure enclosure safety and functionality.

## Enrichment Program

An enrichment program will be an integral part of the enclosure management plan. This will involve providing animals with stimulating objects, activities, and feeding methods to encourage natural behaviours and prevent boredom. A well designed enrichment program that has been envisioned for each species housed at GZRRC. The enrichment program is integrated with the the husbandry and management programme as well as the diet regimen of these species. The keepers and biologists actively monitor the biopsychosocial welfare of each animal under their care and make changes to the husbandry regimen, enrichment programme and diet as required.

## Monitoring and Evaluation

The success of the enclosure design and renovation plan will be monitored through regular animal behaviour observations, keeper feedback, and visitor surveys. Data collected will be used to identify areas for improvement and ensure animal well-being remains a top priority.

## CCTV at animal houses and day kraals

Greens Zoological, Rescue and Rehabilitation Centre provides the finest housing and husbandry practices for the care and welfare of captive animals that require constant welfare and veterinary health monitoring. To ensure constant care without causing unnecessary stress to the animals, GZRRC plans to implement 24x7 CCTV monitoring across all retiring cells and paddocks in its facilities. Presently GZRRC has CCTV coverage via the security control room across important points of the facility. However, the GZRRC will employ the use of Artificial intelligence to understand the vocalization and movement type of animals housed inside the paddock area of each enclosure as an early alert system. The CCTV coverage will be used to verify the condition of animals, before an intervention is made. By employing the CCTV cameras along with artificial intelligence, over the course of the next five years GZRRC will fulfil its goal of becoming a fully digitized zoo of the twenty first century.

## Post-Mortem Facility

Greens Zoological, Rescue and Rehabilitation Centre has rescued animals from several facilities all over the world, that were housed under various conditions of chronic abuse and stress. Presently GZRRC is home to some of the most fragile and sensitive species that require constant care and monitoring. A modern post-mortem room is necessary infrastructure to understand and develop resilience for the most common and emergent causes of deaths in the animals. The backup post mortem facility will serve the following purpose:

1. **Disease Outbreak Management:** In case of a disease outbreak, a BPMR allows for isolating deceased animals and conducting necropsies (animal autopsies) in a separate space to prevent the spread of pathogens to the primary post mortem room. This safeguards the integrity of future examinations and minimizes biosecurity risks.
2. **Increased Necropsy Capacity:** During disease outbreaks or periods of high mortality, the BPMR can act as surge capacity, accommodating additional necropsies if the primary room becomes overloaded. This ensures timely examinations and identification of potential disease threats.
3. **Improved Efficiency and Research Potential:**
  - a. **Minimized Disruptions:** Maintenance or repairs on the primary post mortem room will not impede or halt the necropsy procedures entirely.
  - b. **Research Continuity:** Research involving animal tissues often relies on samples obtained during necropsies. A BPMR allows such research to proceed even if the primary room is unavailable, preventing disruptions to ongoing investigations.

- c. **Space and Resource Availability:** Implementing a BPMR requires allocating space and resources. Carefully consider these factors in relation to the GZRRC's budget and facility layout.
- d. **Biosecurity Measures:** The BPMR needs to adhere to the same biosecurity protocols as the primary post mortem room to prevent cross-contamination and ensure staff safety.

Overall, a backup post mortem room, can significantly enhance the GZRRC's management plan by ensuring proper animal care during unforeseen circumstances, improving necropsy efficiency, and potentially aiding in disease outbreak management.

## Research

The research programme of Greens Zoological, Rescue and Rehabilitation Programme will focus on broadening the horizon of research in the fields of wildlife, conservation, veterinary, captive animal management, animal welfare and conservation breeding programmes.

- a. **Research Priorities:** Greens Zoological, Rescue and Rehabilitation Centre will prioritize research projects that align with its mission and goals. Potential areas of focus include:
  - 1. **Animal welfare:** Studies on enrichment techniques, stress reduction methods, and optimal enclosure design.
  - 2. **Animal health:** Research on disease prevention, nutrition, and geriatric animal care.
  - 3. **Conservation science:** Population studies, breeding programs for endangered species, and reintroduction feasibility assessments.
  - 4. **Behaviour:** Studies on social interactions, communication, and cognitive abilities of animals.
  - 5. **Education:** Research on visitor learning styles and developing effective educational programs based on research findings.
  - 6. **Research Review and Approval Process** will be designed and implemented to ensure that all research conducted at GZRRC will meet the overarching objectives of global biodiversity conservation, while meeting ethical considerations for the health and welfare of animals.

## Sustainability

Greens Zoological, Rescue and Rehabilitation Centre has the goal to become net carbon neutral by 2030. To achieve this goal and to meet its water conservation targets, the GZRRC will undertake the following steps and ensure the long-term welfare of animals as well as meeting the goals of sustainable development of local communities, who are our stakeholders for global biodiversity conservation.

### **Sustainability goals:**

1. Reduce energy consumption by 15% within three years.
2. Reduce fresh water dependency by 10% in the next two years.
3. Evaluate and implement solid and liquid waste reduction strategies by 50% over the next five years.
4. Implement sustainable procurement practices for all animal supplies and materials within the next one year.
5. Foster a culture of sustainability within the organization.

### **Standard Operating Procedures**

Standard Operating procedures are crucial to the optimal functioning and operation of any organisation. As an emerging global leader in biodiversity conservation, captive animal welfare and management, and veterinary care, GZRRC is striving to curate, optimize and implement the best standard practices to optimise the health and welfare of animals under its care. In this regard, constant development and reassessment of SOPs is required. Improved Animal Welfare:

- **Consistent Care:** SOPs ensure all animals receive high-quality care consistently. They outline proper feeding protocols, enrichment activities, hygiene practices, and veterinary treatment procedures. This consistency minimizes stress and promotes animal well-being.
- **Emergency Preparedness:** SOPs guide staff during emergencies like animal escapes, natural disasters, or outbreaks of disease. Clear protocols ensure a swift and coordinated response to minimize risks and ensure animal safety.
- **Staff Safety and Efficiency:**
- **Reduced Risk:** SOPs outline safe handling procedures for different animal species. This reduces the risk of injuries to staff while interacting with potentially dangerous animals.
- **Training and Competency:** SOPs serve as training tools for new staff and ensure existing staff maintain competency in essential tasks. This promotes a skilled workforce capable of providing optimal animal care.
- **Increased Efficiency:** SOPs streamline daily routines like animal feeding, cleaning enclosures, and record-keeping. This allows staff to work more efficiently and dedicate more time to animal enrichment and interaction.
- **Accreditation and legal compliance:** Robust SOPs are essential to the compliance of any modern zoological institution and therefore, as a institution of global outreach and repute, it is vital that GZRRC adheres to the best practices of zoo management all over the world.

### **Outreach and Education Programme**

Education and outreach programs are vital components of a well-rounded management plan for the Greens Zoological, Rescue and Rehabilitation Centre (GZRRC) for several reasons:

1. Conservation Awareness:
  - a. Raising awareness: These programs educate visitors about the importance of wildlife conservation, endangered species, and the threats they face. This knowledge encourages visitors to adopt more sustainable practices and become advocates for animal welfare.
  - b. Appreciating Biodiversity: Educational programs can foster appreciation for biodiversity and the ecological roles various animal species play. This appreciation can motivate visitors to support conservation efforts.
2. Public Support:
  - a. Generating interest: Effective outreach programs can generate public interest in the GZRRC's mission. This can lead to increased visitation, volunteer participation, and potential financial donations, all crucial for the centre's operations and animal care.
  - b. Building Partnerships: Outreach programs can establish connections with schools, environmental organizations, and other stakeholders. These partnerships can provide valuable educational resources, volunteers, and potential funding opportunities.
3. Community Engagement:
  - a. Fostering Connection: Educational programs can connect the local community with the GZRRC and the animals it houses. This fosters a sense of responsibility and encourages community involvement in conservation efforts.
  - b. Responsible Wildlife Interaction: Outreach programs can educate the public about responsible wildlife interaction in the wild and around the GZRRC. This can help minimize human-wildlife conflict and ensure animal safety.
4. Examples of Educational and Outreach Programs:
  - a. Guided tours by trained educators focusing on animal behaviour, conservation needs, and the GZRRC's rescue and rehabilitation efforts.
  - b. Interactive exhibits with informative displays and opportunities for visitors to learn about specific species and their habitats.
  - c. Educational talks and workshops by GZRRC staff or visiting conservationists on various topics related to wildlife and conservation.
  - d. School programs tailored to different age groups, incorporating age-appropriate activities and lessons about animal welfare and conservation.
  - e. Social media outreach using engaging content to raise awareness about the GZRRC's work and the importance of conservation.

By implementing effective education and outreach programs, the GZRRC can not only fulfil its mission of animal rescue and rehabilitation but also create a well-informed and engaged community that actively supports wildlife conservation efforts.

## **Conservation Breeding Programme at Greens Zoological Rescue and Rehabilitation Centre**

The Conservation Breeding Programme of GZRRC is one of its flagship programme that adheres to its mission of global biodiversity conservation. Through this programme, GZRRC will identify threatened global fauna that require intense protection and through collaboration with local and global strategic partners, acquire, maintain and proliferate a genetically diverse captive population of the species that has the ability to be repatriated back to reclaimed habitats. GZRRC has identified more than 49 species that it has proposed for its conservation breeding programme. The conservation breeding programme for White-rumped vultures, Asiatic lion, Spix's macaw, Lear's macaw and St. Vincent's Amazon are presently ongoing. During the course of the next few years, conservation breeding programmes for other species will be initiated.

## **Digitization of Zoo Management**

Modern Zoo management requires careful insights about the status of the facility and all the stakeholders i.e. animals, staff and visitors. Greens Zoological, Rescue and Rehabilitation Centre envisages to be a pioneering institution for animal care and welfare. Following are the areas of zoo management that will benefit from GZRRC's mission of digitization.

1. Improved Animal Care: Animal health and welfare monitoring will become streamlined in a modern data driven zoo.
2. Data-driven Decisions: Digitization allows for real-time data collection on animal behaviour, health vitals, and food consumption. This data can be used to personalize care plans, identify health issues early, and optimize diets for individual animals.
3. Remote Monitoring: Cameras and sensors can be used for remote monitoring of animal enclosures. This allows keepers to identify potential problems, like injuries or fights, and intervene quickly, even during off-hours.
4. Enhanced Recordkeeping: Electronic medical records and animal profiles can be easily accessed and updated, ensuring complete and readily available information for informed decision-making.

## **Signage Design and implementation**

Greens Zoological, Rescue and Rehabilitation Centre will conceptualise, design, develop and install informational and digital signage across its facilities to provide correct information and align visitors with its education and awareness goals. Additional signage will be installed to ensure that the husbandry practices for the species housed at the facility is in line with the captive management plan of the species. These signage will act as training tools for keepers, biologists and interns and ensure optimum health and welfare of animals housed at GZRRC.

## **Broad budget analysis for the financial year 2023-2024**

During this financial year, GZRRC has initiated the development of enclosures and the renovation of enclosures and habitats for animals under the care of GZRRC. During this period, GZRRC initiated the plans to develop a back up incinerator and post-mortem room. GZRRC prides itself for being a facility with one hundred percent CCTV coverage, which requires regular maintenance and regular equipment upgrade, this work was carried out this year. GZRRC has formulated its research plan as mentioned in this document, presently the data collection for the research plan is presently ongoing for publication in academic peer-reviewed journals.

## **Broad budget analysis for the financial year 2024-2025**

During the period 2024-2025, GZRRC will focus its attention on enclosure construction and developing habitats for species housed in its premises. GZRRC plans to shift some of its primates to larger naturalistic habitats, these enclosures are currently being developed. The work of perimeter wall repair that was initiated in the last financial year will be completed during this period.

## **Broad budget analysis for the financial year 2025-2026**

During this financial year, the primary focus of GZRRC will be on enclosure construction, renovation and maintenance. Additionally, GZRRC will be focusing on the structuring of its proposed conservation breeding programmes and the on-ground implementation of the same. GZRRC will continue to focus on rescuing animals from poor welfare conditions, which will require significant infrastructure development and upgrade. Achieving sustainability in power and water usage is a crucial aspect of GZRRC's long-term goals, GZRRC will make significant headway in that area during this period.

## **Broad budget analysis for the financial year 2026-2027**

During this period GZRRC will work towards completing the digitization of all zoo records and making the organization paperless to reduce its carbon footprint. Perimeter wall maintenance will be carried out during this period to ensure structural integrity and mitigate the risk of animal escape.

Table 11.1: Broad Budget for Management Plan for the period between 2023-2024

SI No	Activity type	Estimated Cost( in lakhs INR)	Remarks
1	Mission and Vision	3	Completed
2	Master Layout Plan	10	Completed
3	Master Layout Plan	0.2	Completed
4	Animal Collection Plan	0.3	Completed
5	Animal Collection Plan	0.4	Completed
6	Enclosure Construction and Renovation	8000	Ongoing
7	CCTV Installation Across Facilities	200	Ongoing
8	Additional Post Mortem Facility	50	Ongoing
9	Capacity Enhancement of Incinerator	100	Ongoing
10	Perimeter Wall	1000	Completed
11	Veterinary Care	1000	Ongoing
12	Animal Welfare	200	Ongoing
13	Conservation Breeding Programme	2000	Ongoing
14	Decongestion of Zoos and Rescue Centres	1000	Ongoing
15	Research	100	Ongoing
16	Sustainability-Power	100	Ongoing
17	Sustainability-Water	100	Ongoing
18	Digitization of Zoo Management	300	Ongoing
19	Signage Design and Development	200	Ongoing

Table 11.2: Broad budget for Management Plan for the period between 2024-2025

Sl_no	Activity type	Estimated Cost( in lakhs INR)	Remarks
1	Enclosure Construction and Renovation	2000	Ongoing
2	CCTV Installation Across Facilities	50	Ongoing
3	Additional Post Mortem Facility	50	Ongoing
4	Capacity Enhancement of Incinerator	100	Ongoing
5	Perimeter Wall Repair	100	Completed
6	Veterinary Care	1000	Ongoing
7	Animal Welfare	200	Ongoing
8	Conservation Breeding Programme	2000	Ongoing
9	Decongestion of Zoos and Rescue Centres	1000	Ongoing
10	Research	100	Ongoing
11	Sustainability-Power	100	Ongoing
12	Sustainability-Water	100	Ongoing
13	Digitization of Zoo Management	300	Ongoing
14	Signage Design and Development	100	Ongoing

Table 11.3: Broad budget for Management Plan for the period between 2025-2026

Sl_no	Activity type	Estimated Cost( in lakhs INR)	Remarks
1	Enclosure Construction and Renovation	2000	Ongoing
2	CCTV Installation Across Facilities	50	Ongoing
3	Additional Post Mortem Facility	50	Ongoing
4	Capacity Enhancement of Incinerator	100	Ongoing
5	Perimeter Wall	1000	Completed
6	Veterinary Care	1000	Ongoing
7	Animal Welfare	200	Ongoing
8	Conservation Breeding Programme	2000	Ongoing
9	Decongestion of Zoos and Rescue Centres	1000	Ongoing
10	Research	100	Ongoing
11	Sustainability-Power	100	Ongoing
12	Sustainability-Water	100	Ongoing
13	Digitization of Zoo Management	100	Ongoing
14	Signage Design and Development	100	Ongoing

Table 11.4: Broad budget for Management Plan for the period between 2026-2027

Sl_no	Activity type	Estimated Cost( in lakhs INR)	Remarks
1	Perimeter Wall Repair and Reinforcement	100	Pending
2	Enclosure Construction and Renovation	2000	Ongoing
3	CCTV Installation Across Facilities	50	Ongoing
4	Additional Post Mortem Facility	50	Ongoing
5	Capacity Enhancement of Incinerator	100	Ongoing
6	Perimeter Wall	1000	Completed
7	Veterinary Care	1000	Ongoing
8	Animal Welfare	200	Ongoing
9	Conservation Breeding Programme	2000	Ongoing
10	Decongestion of Zoos and Rescue Centres	1000	Ongoing
11	Research	100	Ongoing
12	Sustainability-Power	100	Ongoing
13	Sustainability-Water	100	Ongoing
14	Digitization of Zoo Management	100	Ongoing
15	Signage Design and Development	100	Ongoing

Table 11.5: Broad budget for Management Plan for the period between 2027-2028

Sl_no	Activity type	Estimated Cost( in lakhs INR)	Remarks
1	Alignment with Mission and Vision	0	Ongoing
2	Enclosure Construction and Renovation	2000	Ongoing
3	Perimeter Wall Repair and Reinforcement	100	Pending
4	CCTV Installation Across Facilities	50	Ongoing
5	Additional Post Mortem Facility	50	Ongoing
6	Veterinary Care	1000	Ongoing
7	Animal Welfare	200	Ongoing
8	Conservation Breeding Programme	2000	Ongoing
9	Decongestion of Zoos and Rescue Centres	1000	Ongoing
10	Research	100	Ongoing
11	Sustainability-Power	100	Ongoing
12	Sustainability-Water	100	Ongoing
13	Digitization of Zoo Management	100	Ongoing
14	Signage Design and Development	100	Ongoing

## Broad budget analysis for the financial year 2027-2028

During this period the focus of GZRRC will be to continue its work in the field of captive animal rescue and conservation breeding. New Enclosure construction, renovation and maintenance will continue to be prioritised based on the emerging needs of captive population management. During this period GZRRC will be well on its way towards achieving its sustainability goals. Most of the activities will be completed during this period and GZRRC will initiate the process of re-evaluating its targets and priorities in adherence to the master plan and the management plan.

Table 11.6: Broad Structure of the Management Plan for 2023-2028

Sl_no	Activity Type	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
1	Additional Post mortem facility	Ongoing	Ongoing	Operational	Operational	Operational
2	Alignment with Mission and Vision	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
3	Animal Collection Plan	Completed	Completed	Completed	Completed	Completed
4	Animal Welfare	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
5	CCTV Installation Across Facilities	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
6	Capacity Enhancement of Incinerator	Ongoing	Ongoing	Ongoing	Completed	Completed
7	Conservation Breeding Programme	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
8	Decongestion of Zoos and Rescue Centres	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
9	Digitization of Zoo Management	Ongoing	Ongoing	Completed	Completed	Completed
10	Enclosure Construction and Renovation	Ongoing	Ongoing	Completed	Completed	Completed
11	Master Layout Plan	Completed	Completed	Completed	Completed	Completed
12	Mission and Vision	Completed	Completed	Completed	Completed	Completed
13	Perimeter Wall	Completed	Completed	Completed	Completed	Completed
14	Perimeter Wall Repair	Pending	Completed	Completed	Completed	Completed
15	Research	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
16	Signage Design and Development	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
17	Sustainability-Power	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
18	Sustainability-Water	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
19	Veterinary Care	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing



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**Part-IV- Annexures**





## **Annexure I- Approved Layout Plans of Greens Zoological Rescue and Rehabilitation Centre**



GOVERNMENT OF INDIA  
भारत सरकार

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
**Central Zoo Authority**  
केन्द्रीय चिड़ियाघर प्राधिकरण

F. No. 20-1/2019-CZA(PKR)/258/2019

**By Post**  
Dated: 14.02.2019

To,  
The Sr. Vice President - Corporate Affairs,  
Reliance Industries Limited,  
"VRAJ", Near Suvidha Shopping Center,  
Paldi, Ahmedabad - 380 007 (Gujarat)

**Sub:- Establishment of the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat by Reliance Industries Limited - reg.**

**Ref:-**

1. Your letter No. NIL dated 07.01.2019.
2. The Chief Wildlife Warden, Gujarat letter No. WLP/T.26/B/9428-30/2018-19, dated 23.01.2019.
3. This office letter F. No. 20-1/2019-CZA(PKR)/227/2019, dated: 14.02.2019.

Sir,

Reference is invited to the above cited correspondences.

The proposal for establishment of the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat by Reliance Industries Limited on an area of 250 Acres was scrutinized in the Central Zoo Authority (CZA).

The CZA conveys the approval under Section 38-H(1A) of the Wild Life (Protection) Act, 1972 to the establishment of the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat subject to fulfilment of the following conditions:-

- i. Observations of the Expert Group on Zoo Designing of the CZA communicated vide letter F. No. 20-1/2019-CZA(PKR)/227/2019, dated 14.02.2019.
- ii. The Reliance Industries Limited should submit an undertaking that the requisite number of experts of various disciplines including a competent Whole time in-charge, Animal Curator, Biologist, Veterinary Officer would be posted for execution of the said project.
- iii. The Reliance Industries Limited shall make provision on their own for necessary funds for creation of the proposed Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat as well as for future maintenance of the establishment on professional grounds.

*Continued...*

B-1 Wing, 6<sup>th</sup> Floor, Pt. Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road, New Delhi-110003

बी-1 विंग, छठा तल, पंडित दीनदयाल अन्तोदय भवन, सीजीओ परिसर, लोधी रोड़, नई दिल्ली-110003

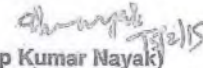
Tel.: 011-24367846, 24367851, 24367852, Fax: 011-24367849

E-mail: cza@nic.in, Website: <http://www.cza.nic.in>

- iv. Once the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat becomes ready for operation, it shall be made functional formally after getting prior recognition from the CZA under Section 38H(1), (3) and (4) of the Wild Life (Protection) Act, 1972.
- v. The ultimate responsibility of upkeep and welfare of animals at the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat in accordance to the Guidelines and Rules notified by the Government of India in this behalf would lie on the Reliance Industries Limited.

This is for your information and necessary action.

Yours sincerely,

  
(Dr. Anup Kumar Nayak)  
Member Secretary

Copy for information and necessary action to:-

The Chief Wildlife Warden, Government of Gujarat, Aranya Bhawan, Block – A, 1<sup>st</sup> Floor, Opp. St. Xavier's School, Sector – 10, Gandhinagar – 382 010 (Gujarat), E-mail: [cwlguj@gmail.com](mailto:cwlguj@gmail.com)



Figure 11.1: CZA Approved Layout Plan of Greens Zoological Rescue and Rehabilitation Centre (18.02.2019)



F. No. 20-1/2019-CZA(PKR)  
Government of India  
Ministry of Environment, Forest and Climate Change  
Central Zoo Authority

B-1 Wing, 6<sup>th</sup> Floor  
Pandit Deendayal Antyodaya Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi – 110 003,  
Telephone: +91-11-24367846/51/52,  
E-mail: cza@nic.in

Dated: 11.09.2020

To,

The Sr. Vice President – Corporate Affairs,  
Reliance Industries Limited,  
"VRAJ", Near Suvidha Shopping Center,  
Paldi, Ahmedabad – 380 007,  
Gujarat  
(E-mail: paresh.davey@ril.com, brij2.gupta@reliancefoundation.org).

**Sub:- Signed copy of the amended Master (Layout) Plan of the Greens Zoological Rescue and Rehabilitation Kingdom, Jamnagar, Gujarat and Master (Layout) Plan of the Satellite Rescue Centre for Leopards at the Greens Zoological Rescue and Rehabilitation Kingdom, Jamnagar, Gujarat – regarding.**

**Ref:- This office letter No. 7-9/2020-CZA(PKR), dated 08.06.2020.**

Sir,

With reference to above, I am directed to inform that the amended Master (Layout) Plan of the Greens Zoological Rescue and Rehabilitation Kingdom, Jamnagar, Gujarat and Master (Layout) Plan of the Satellite Rescue Centre for Leopards at the Greens Zoological Rescue and Rehabilitation Kingdom, Jamnagar, Gujarat were placed before the Expert Group on Zoo Designing of CZA in its 93<sup>rd</sup> meeting held through circulation on 19.05.2020, wherein the same were recommended for approval of the Technical Committee, Central Zoo Authority subject to following conditions:-

1. The compliance of the amended Master (Layout) Plan seems as per condition stipulated.
2. The additional satellite facility proposed in the revised Master (Layout) Plan is good initiative, for life time care of rescued Leopards.
3. The assemblage of predators and prey enclosures should not be in close proximity, if any, adequate spatial separation should be provided alongwith screening.
4. The Satellite facility should have adequate green buffer around it.
5. Drawings for various services i.e. water supply line, electric distribution lines with lamp post, storm water drainage, STP treated water line etc. are to be separately provided for better clarity and some items like tube well, Rainwater Harvesting are shown as provided but these are not marked on the drawing.
6. Font size may be increased so as to make it properly legible.

The observations of the said Design Committee were communicated to the Zoo vide letter referred above.

Further, the same were placed in the 96<sup>th</sup> Meeting of the Technical Committee, Central Zoo Authority held online on 30.07.2020, wherein the same has been recommended

for approval of the Central Zoo Authority. Subsequently, the competent authority has approved the same dated 20.08.2020.

As the Zoo Operator has complied the said conditions, authenticated copy of the Master (Layout) Plan of the Greens Zoological Rescue and Rehabilitation Kingdom, Jamnagar, Gujarat and Master (Layout) Plan of the Satellite Rescue Centre for Leopards at the Greens Zoological Rescue and Rehabilitation Kingdom, Jamnagar, Gujarat are enclosed with this letter for necessary action at your end and records.

Yours sincerely,



(Dr. Sonali Ghosh)  
DIG (HQ)

Encl.: As above.

Copy for information and necessary action to:-

1. The Chief Wildlife Warden, Government of Gujarat, Aranya Bhawan, Block – A, 1<sup>st</sup> Floor, Opp. St. Xavier's School, Sector-10, Gandhinagar – 382 010, Gujarat (E-mail: cwlwguj@gmail.com).





Figure 11.2: CZA Approved Layout Plan of Greens Zoological Rescue and Rehabilitation Centre(11.09.2020)



I/5715/2021

**Computer No. 165005**  
Government of India  
Ministry of Environment, Forest and Climate Change  
CENTRAL ZOO AUTHORITY

B-1 Wing, 6th Floor,  
Pandit Deendayal Antyodaya Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi - 110 003,  
Telephone: +91-11-24367846/51/52,  
E-mail: cza@nic.in  
Date: 09/09/2021

To,

The Officer In-charge,  
Greens Zoological, Rescue and Rehabilitation Kingdom,  
Moti Khavdi, Jamnagar, Gujarat  
(E-mail: brij2.gupta@reliancefoundation.org).

**Sub:- Approval of the Master (Layout) Plan and Animal Collection Plan of Greens Zoological Rescue & Rehabilitation Centre, Jamnagar, Gujarat - reg.**

**Ref:- (i) Your e-mail correspondence dt. 18.7.2021.**

**(ii) This office letter no. 158748 dt. 14.7.2021.**

Sir,

With reference to correspondence cited above, I am directed to convey that, the Master (Layout) Plan and Animal Collection Plan of Greens Zoological Rescue & Rehabilitation Centre, Jamnagar, Gujarat was scrutinized in the 100<sup>th</sup> Expert Group on Zoo Designing, CZA on 2<sup>nd</sup> & 3<sup>rd</sup> August, 2021 and recommended to the Technical committee, CZA for the approval of the said Master Plan subject to the certain conditions/ observations (**Annexure 1**) and time-bound compliance to the same.

Accordingly, the same was placed before Technical Committee of the Central Zoo Authority in its 102<sup>nd</sup> Meeting held on 13th August, 2021. The Technical Committee recommended to the Central Zoo Authority for approval of the Master (Layout) Plan and Animal Collection Plan of Greens Zoological Rescue & Rehabilitation Centre, Jamnagar, Gujarat subject to the compliance of the conditions/ observations stipulated by the Expert Group on Zoo Designing, CZA (**Annexure 1**).

This office conveys the approval of competent authority to the Master (Layout) Plan and Animal Collection Plan of Greens Zoological Rescue & Rehabilitation Centre, Jamnagar, Gujarat subject to compliance of the conditions (**Annexure 1**) and re-submission of the same by incorporating the same in comprehensive Master Plan for authentication to this authority within one month period from the date of issue of this letter.

This is for your information and necessary action.

**Yours Sincerely,**

**Encl.:** as above.

sd/-

**(Sonali Ghosh)**  
**(Dy Inspector General Of Forest)**

**Copy for information to:**

1. The Chief Wildlife Warden, Government of Gujarat, Aranya Bhawan, Block - A, 1<sup>st</sup> Floor, Opp. St. Xavier's School, Sector - 10, Gandhinagar - 382 010, Gujarat (E-mail: cwlwguj@gmail.com).

**Annexure 1****Detailed observations of Expert Group on Zoo Designing, CZA on the said proposal during the 100<sup>th</sup> meeting held on 2<sup>nd</sup> & 3<sup>rd</sup> June, 2021.**

- 1) The animal collection plan deliberated in 99th meeting included 356 species, which has now been increased to more than 700 species. One of sources of acquisition is listed as "parivesh" in the animal collection plan and the same shall be removed. The acquisition of all the species by the zoo should be compliant with section 38-I, other relevant sections of the Wild Life (Protection) Act, 1972 and extant guidelines of the Central Zoo Authority.
- 2) Species nomenclature shall be rectified in the Animal Collection Plan and layout plan as per observations communicated earlier based on scrutiny in the 99th Expert Group on Zoo Designing and duplicates shall be removed.
- 3) With regard to the collection plan, detailed compliance on the following points should be provided in the master plan:
  - a. Approvals for the acquisition of animals by the said facility that have been granted the CZA should be incorporated.
  - b. Compliance to the observations of the 99th EGZD shall be provided.
  - c. Further, some of these species given their endemicity, extreme rarity (e.g. Forest Owllet) have specialised biological requirements which are difficult to replicate in captivity. Their corresponding husbandry knowledge is also not available. Clarification for the same should be included in the Master Plan. Further, to ensure optimal husbandry and successful housing of these species, established collaboration for acquisition and management with international programs should be indicated in the Master Plan.
  - d. Acquisition process for the species sparsely/not represented in captive collections across the world should be outlined in the Master Plan.
  - e. For all the species identified for conservation breeding, detailed plan, target collection and source of acquisition should be mentioned.
  - f. Climatic conditions at the zoo location are not ideal for several species and the housing planned for such species should be outlined in the master plan.
  - g. Details pertaining to insect collection and their housing should be provided.
  - h. Negative numbers indicated in the collection plan should be rectified.
  - i. Species level binominal nomenclature should be mentioned in the plan.
- 4) The layout needs to be revised with reference to the following points:
 

Services maps as prescribed in Guidelines for the establishment and scientific management of zoos (2008) should be submitted.

  - a. All the features indicated in the plan should be labelled in the legend.
  - b. Area allocation should be compliant with Rule 10 (3.4) under Recognition of Zoo Rules, 2009.
  - c. The following details should be included in Chapter IV of the Master Plan or should be included in the Master (Layout) Plan:
    - i. Total area of the zoo:
    - ii. Area under green belt:
    - iii. Area allocated for animal housing (includes area of outdoor enclosures, retiring cells/night shelters and kraal i.e., all areas that are accessible by animals):
    - iv. Built-up area of buildings (excluding animal housing)
  - d. All the multi-species exhibits proposed should indicate areas for isolation and

I/5715/2021

- holding and pertinent details should be included in the Master Plan. They should also be planned according to the species-specific requirement and further it should correlate with the target collection (e.g. Mixed species exhibit for American Tapir, Guanaco, Chilean Pudu, Reindeer, Bighorn Deer, Baird's Tapir and Two-toed Sloth has an area allocation of 2200m<sup>2</sup>; correlating the same with the collection it is observed that the space allocated for individual animal is less than 70 m<sup>2</sup>). Similar issue was observed in case of other mixed species exhibits and the same shall be rectified.
- e. Housing allocated is not as per prescribed guidelines and the same shall be rectified (e.g. Raptors/Birds of Prey, Mixed species exhibit of Przewalski's horse Horse and Sika Deer is proposed with an area of 1000m<sup>2</sup> which does not conform to CZA guidelines).
  - f. The concept of placing Musk Deer (a Himalayan species) amongst Indian Forest species and not in Indian mountains shall be revisited.
  - g. Enclosures not allocated for any species shall be renamed appropriately.
  - h. The purpose of 'workshop' amidst primate enclosures shall be clarified.
- 5) Further, it was observed that extensions of the satellite rescue facility and rescue and rehabilitation centre has been proposed. The members opined that repeated revisions may henceforth be avoided, and a final layout shall be submitted for the consideration of the Central Zoo Authority.
- 6) The comprehensive Master Plan shall also be submitted based on this for consideration of the Central Zoo Authority.

\*\*\*

Computer no. 138776  
Government of India  
Ministry of Environment, Forest and Climate Change  
Central Zoo Authority

B-1 Wing, 6<sup>th</sup> Floor,  
Pandit Deendayal Antyodaya Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi – 110 003.  
Telephone: + 91-11-24367846/51/52,  
Dated: 26.10.2021

To,

The Director,  
Greens Zoological Rescue and Rehabilitation Centre,  
SSO-A5, Moti Khavdi,  
Jamnagar, Gujarat – 361 140.  
(E-mail: brij2.gupta@reliancefoundation.org)

**Sub:- Authentication of the drawing of Gharial and Leopard enclosure to be constructed at the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat and Layout Plan of the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar – regarding.**

Ref:-

1. This office letter no. I/5037/2021 dated 18.07.2021, letter No. 7-7/2021-CZA dated 27.08.2021 & I/5715/2021 dated 09.09.2021.
2. Your e-mail correspondences of even dated.

Sir,

With references to the correspondence cited above, please find attached the authenticated copy of drawings of the Layout Plan of the Greens Zoological, Rescue and Rehabilitation Centre, and enclosure of Gharial & Leopard to be constructed at the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat.

This is for your information and records.

Yours sincerely,

**Encl.: As above.**

  
(Dr. S.P. Yadav)  
Member Secretary

**Copy for information and necessary action to:-**

1. The Chief Wildlife Warden, Government of Gujarat, Aranya Bhawan, Block – A, 1<sup>st</sup> Floor, Opp. St. Xavier's School, Sector – 10, Gandhinagar – 382 010, Gujarat (E-mail: cwlwguj@gmail.com).

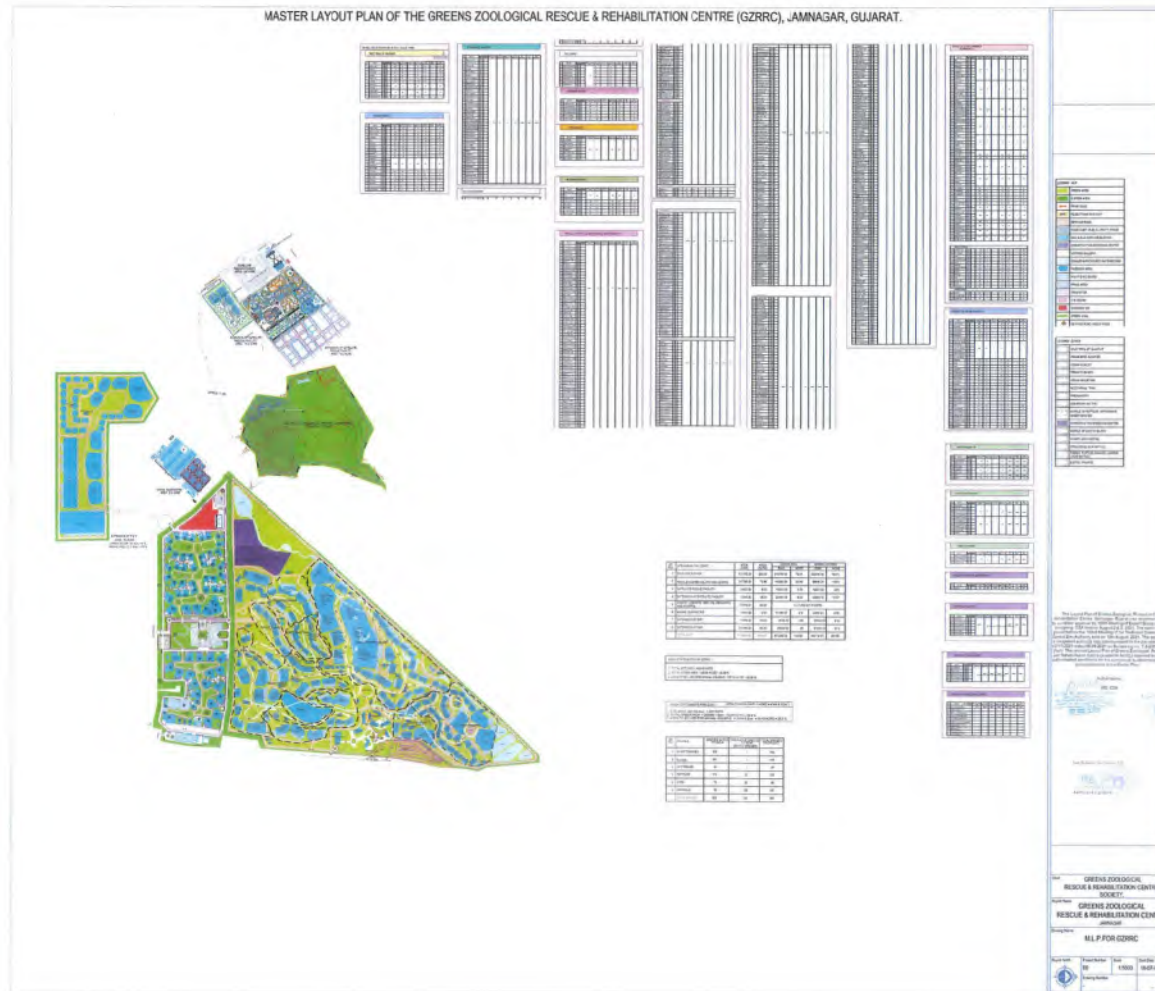


Figure 11.3: CZA Approved Layout Plan of Greens Zoological Rescue and Rehabilitation Centre (26.10.2021)



## **Annexure II- Proposed Layout Plans**

# **Proposed Layout Plans of Greens Zoological Rescue and Rehabilitation Centre**

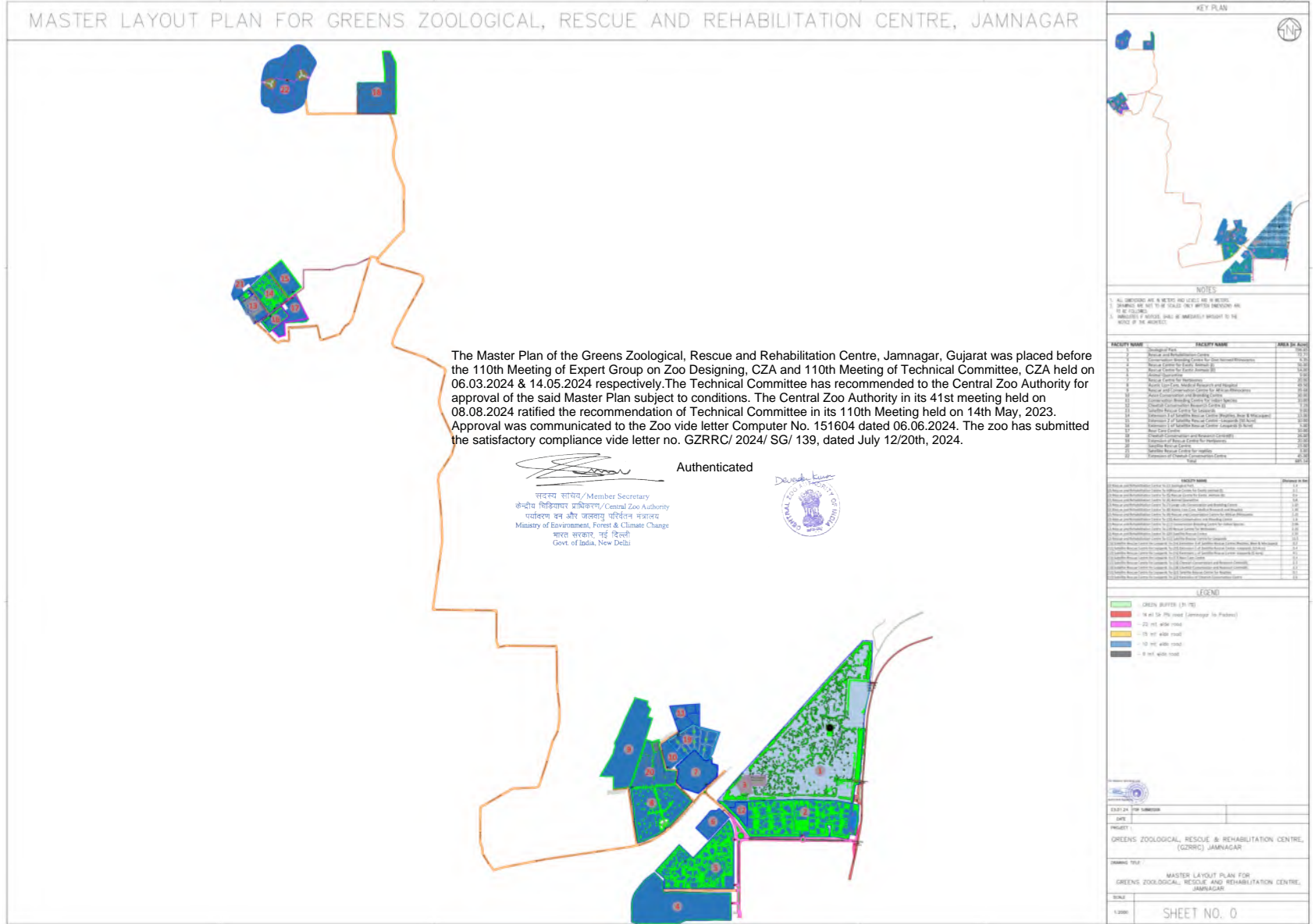


Figure 11.4: Proposed Master Layout Plan for Greens Zoological Rescue and Rehabilitation Centre along with Road Network















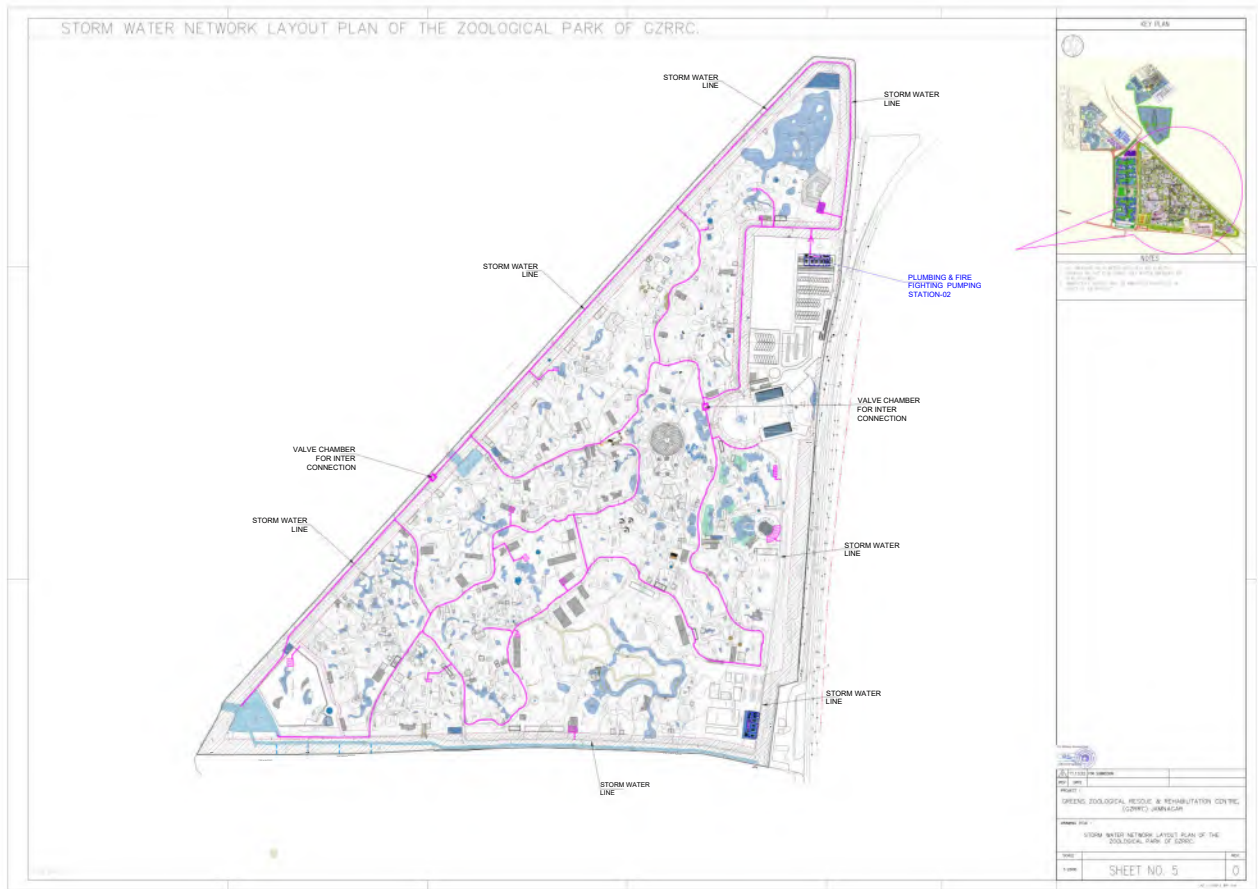


Figure 11.9: Storm Water Drainage Layout for Greens Zoological Rescue and Rehabilitation Centre



## Annexure III- Approved Animal Collection Plan of Greens Zoological Rescue and Rehabilitation Centre

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021)

Sl	Common Name	Scientific Name	M	F	U	T
<b>Indigenous mammals</b>						
1	Hog deer	<i>Axis porcinus</i>	2	3	0	5
2	Sangai deer	<i>Rucervus eldii eldii</i>	3	5	0	8
3	Swamp deer	<i>Rucervus duvaucelii</i>	3	5	0	8
4	Sambar deer	<i>Rusa unicolor</i>	3	5	0	8
5	Spotted deer	<i>Axis axis</i>	4	8	0	12
6	Four-horned antelope	<i>Tetracerus quadricornis</i>	2	4	0	6
7	Chinkara	<i>Gazella bennettii</i>	2	5	0	7
8	Barking deer	<i>Muntiacus muntjak</i>	3	5	0	8
9	Indian spotted chevrotain-mouse deer	<i>Moschiola indica</i>	2	5	0	7
10	Blackbuck	<i>Antilope cervicapra</i>	2	6	0	8
11	Musk deer	<i>Moschus leucogaster</i>	2	4	0	6
12	Indian gaur	<i>Bos gaurus</i>	2	4	0	6
13	Himalayan goral	<i>Naemorhedus sp.</i>	3	5	0	8
14	Himalayan tahr	<i>Hemitragus jemlahicus</i>	2	5	0	7
15	Takin	<i>Budorcas taxicolor</i>	2	4	0	6
16	Pygmy hogs	<i>Porcula salvania</i>	2	4	0	6
17	One horned rhinoceros	<i>Rhinoceros unicornis</i>	1	2	0	3
18	Wild ass	<i>Equus hemionus khur</i>	2	4	0	6
19	Asiatic lion	<i>Panthera leo leo</i>	2	4	0	6
20	Bengal tiger	<i>Panthera tigris tigris</i>	2	4	0	6
21	Leucistic tiger	<i>Panthera tigris</i>	2	4	0	6
22	Clouded leopard	<i>Neofelis nebulosa</i>	2	3	0	5
23	Snow leopard	<i>Panthera uncia</i>	2	3	0	5
24	Leopard	<i>Panthera pardus</i>	2	4	0	6
25	Caracal	<i>Caracal caracal</i>	2	4	0	6
26	Eurasian lynx	<i>Lynx lynx</i>	1	1	0	2
27	Sloth bear	<i>Melursus ursinus</i>	2	4	0	6

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
28	Asiatic black bear	<i>Ursus thibetanus</i>	2	3	0	5
29	Brown bear	<i>Ursus arctos</i>	2	3	0	5
30	Red panda	<i>Ailurus fulgens</i>	2	3	0	5
31	Indian wolf	<i>Canis lupus pallipes</i>	2	4	0	6
32	Desert fox	<i>Vulpes vulpes pusilla</i>	2	4	0	6
33	Dhole	<i>Cuon alpinus</i>	2	4	0	6
34	Bengal fox	<i>Vulpes bengalensis</i>	2	4	0	6
35	Smooth coated otter	<i>Lutrogale perspicillata</i>	2	4	0	6
36	Indian giant flying squirrel	<i>Petaurista philippensis</i>	2	4	0	6
37	Indian giant squirrel	<i>Ratufa indica</i>	2	4	0	6
38	Indian crested porcupineă	<i>Hystrix indicaă</i>	2	4	0	6
40	Hedgehog	<i>Hemiechinus collaris</i>	2	4	0	6
41	Golden langur	<i>Trachypithecus geei</i>	2	3	0	5
42	Lion-tailed macaque	<i>Macaca silenus</i>	2	3	0	5
43	Assamese macaque	<i>Macaca assamensis</i>	2	3	0	5
44	Pig tailed macaque	<i>Macaca nemestrina</i>	2	3	0	5
45	Spectacled langur	<i>Trachypithecus obscurus</i>	2	3	0	5
46	Hoolock gibbon	<i>Hoolock hollock</i>	2	3	0	5
<b>Exotic mammals</b>						
47	Arabian oryx	<i>Oryx leucoryx</i>	4	6	0	10
48	Scimitar oryx	<i>Oryx dammah</i>	4	6	0	10
49	Addax	<i>Addax nasomaculatus</i>	2	3	0	5
50	Dama gazel	<i>Nanger dama</i>	2	3	0	5
51	Bongo	<i>Tragelaphus eurycerus</i>	2	3	0	5
52	Pere David's deer	<i>Elaphurus davidianus</i>	2	3	0	5
53	Sikka deer	<i>Cervus nippon</i>	2	3	0	5
54	Fallow deer	<i>Dama dama</i>	2	3	0	5
55	Red deer	<i>Cervus elaphus</i>	2	3	0	5
56	Water deer	<i>Hydropotes inermis</i>	2	3	0	5
57	Dik dik	<i>Madoqua sp.</i>	2	3	0	5
58	Chilean pudu	<i>Pudu puda</i>	2	3	0	5
59	Northern pudu	<i>Pudu mephistophiles</i>	2	3	0	5

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
60	Common eland	Tragelaphus oryx	2	3	0	5
61	Sable antelope	Hippotragus niger	2	3	0	5
62	Mountain reedbuck	Redunca fulvorufula	2	3	0	5
63	Nile lechwe	Kobus megaceros	2	3	0	5
64	Sitatunga	Tragelaphus spekii	2	3	0	5
65	Blesbok	Damaliscus pygargus phillipsi	2	3	0	5
66	Common waterbuck	Kobus ellipsiprymnus	2	3	0	5
67	Defassa waterbuck	Kobus ellipsiprymnus defassa	2	3	0	5
68	Greater kudu	Tragelaphus strepsiceros	4	6	0	10
69	Kafue flats lechwe	Kobus leche	2	3	0	5
70	Lesser kudu	Tragelaphus imberbis	4	6	0	10
71	Lowland nyala	Nyala angasii	2	3	0	5
72	Roan antelope	Hippotragus equinus	2	3	0	5
73	Bontebok	Damaliscus pygargus	4	6	0	10
74	Impala	Aepyceros melampus	2	4	0	6
75	Thomson gazelle	Eudorcas thomsonii	4	6	0	10
76	Saiga	Saiga tatarica	2	3	0	5
77	Goitered gazelle	Gazella subgutturosa	2	3	0	5
78	Wapiti	Cervus canadensis	2	3	0	5
79	Reindeer	Rangifer tarandus	0	0	0	0
80	European elk	Alces alces	2	3	0	5
81	African cape buffaloes	Syncerus caffer	2	3	0	5
82	Wildebeest	Connochaetes taurinus	4	6	0	10
83	Mouflon	Ovis gmelini	3	5	0	8
84	Bighorn sheep	Ovis canadensis	2	3	0	5
85	Barbary sheep	Ammotragus lervia	2	3	0	5
86	Guanaco	Lama guanicoe	2	3	0	5
87	Okapi	Okapia johnstoni	4	6	0	10
88	Giraffe	Giraffa camelopardalis	3	5	0	8
89	Babirusa	Babyrousa babyrussa	2	3	0	5
90	Red river hog	Potamochoerus porcus	2	3	0	5
91	Pygmy hippopotamus	Choeropsis liberiensis	2	3	0	5

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
92	Nile hippopotamus	Hippopotamus amphibius	2	4	0	6
93	Somali wild ass	Equus africanus somaliensis	2	3	0	5
94	Common zebra	Equus quagga	2	3	0	5
95	Przewalski's horse	Equus przewalskii	2	3	0	5
96	Black rhinoceros	Diceros bicornis	2	3	0	5
97	Southern White rhinoceros	Ceratotherium simum	2	3	0	5
98	American tapir	Tapirus terrestris	2	3	0	5
99	Malayan tapir	Tapirus indicus	2	3	0	5
100	Baird's tapir	Tapirus bairdii	2	3	0	5
101	Red kangaroo	Macropus rufus	2	3	0	5
102	Grey kangaroo	Macropus giganteus	2	3	0	5
103	Koala	Phascolarctos cinereus	2	3	0	5
104	Wombat	Lasiornhinus sp.	2	3	0	5
105	Tree kangaroo	Dendrolagus sp.	2	3	0	5
106	Tasmanian devil	Sarcophilus harrisii	2	3	0	5
107	Californian sea lion	Zalophus californianus	2	3	0	5
108	Lion/hybrid	Panthera leo	2	3	0	5
109	Sumatran tiger	Panthera tigris sumatrae	2	3	0	5
110	Jaguar	Panthera onca	2	3	0	5
111	Amur leopard	Panthera pardus orientalis	2	3	0	5
112	Cheetah	Acinonyx jubatus	2	3	0	5
113	Bobcat	Lynx rufus	2	3	0	5
114	Jaguarundi	Puma yagouaroundi	2	3	0	5
115	Fossa	Cryptoprocta ferox	2	3	0	5
116	Maned wolf	Chrysocyon brachyurus	2	3	0	5
117	Bush dog	Speothos venaticus	2	3	0	5
118	American brown bear	Ursus arctos horribilis	2	3	0	5
119	Two toed sloth	Choloepus sp.	2	3	0	5
120	Giant South American anteater	Myrmecophaga tridactyla	2	3	0	5
121	Ring tailed lemur	Lemur catta	2	4	0	6
122	White/Black ruffed lemur	Varecia variegata	2	4	0	6
123	Red ruffed lemur	Varecia rubra	2	4	0	6

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
124	Red howler monkey	<i>Alouatta macconeli</i>	2	4	30	36
125	Squirrel monkey	<i>Saimiri sciureus</i>	2	4	0	6
126	White faced capuchin	<i>Cebus imitator</i>	2	4	0	6
127	Emperor marmoset	<i>Callithrix jacchus</i>	2	4	0	6
128	Talapoin monkey	<i>Miopithecus sp.</i>	2	4	0	6
129	Goeldi's marmoset	<i>Callimico goeldii</i>	2	4	0	6
130	Chimpanzee	<i>Pan troglodytes</i>	2	4	0	6
131	Bonobo	<i>Pan paniscus</i>	2	4	0	6
132	Gorilla	<i>Gorilla gorilla</i>	2	4	0	6
133	Red tailed monkey	<i>Cercopithecus ascanius</i>	2	4	0	6
134	Colobus monkey	<i>Colobus sp.</i>	2	4	0	6
135	De Brazza monkey	<i>Cercopithecus neglectus</i>	2	4	0	6
136	Golden bellied mengaby	<i>Cercocebus chrysogaster</i>	2	4	0	6
137	Greater Spot nosed monkey	<i>Cercopithecus nictitans</i>	2	4	0	6
138	Hamlyn's monkey	<i>Cercopithecus hamlyni</i>	2	4	0	6
139	L' Hoest's monkey	<i>Allochrocebus lhoesti</i>	2	4	0	6
140	Proboscis monkey	<i>Nasalis larvatus</i>	2	4	0	6
141	Nancymae' owl monkey	<i>Aotus nancymaeae</i>	2	4	0	6
142	White faced saki	<i>Pithecia pithecia</i>	2	4	0	6
143	Spider monkey	<i>Ateles sp.</i>	2	4	0	6
144	Uakari monkey	<i>Cacajao calvus</i>	2	4	0	6
145	Wooly monkey	<i>Lagothrix sp.</i>	2	4	0	6
146	Bornean Orangutans	<i>Pongo pygmaeus</i>	2	4	0	6
147	Mandrill	<i>Mandrillus sphinx</i>	2	4	0	6
148	Black lion tamarin	<i>Leontopithecus chrysopygus</i>	2	4	0	6
149	Emperor tamarin	<i>Saguinus imperator</i>	2	4	0	6
150	Golden lion tamarin	<i>Leontopithecus rosalia</i>	2	4	0	6
151	Patas monkey	<i>Erythrocebus patas</i>	2	4	0	6
152	Blue monkey	<i>Cercopithecus mitis</i>	2	4	0	6
153	Hamadryas baboon	<i>Papio hamadryas</i>	2	4	0	6
<b>Indigenous birds</b>						
154	Greater Indian bustard	<i>Ardeotis nigriceps</i>	0	0	0	0

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
155	Bengal florican	Houbaropsis bengalensis	0	0	0	0
156	Greater flamingo	Phoenicopterus roseus	10	20	0	30
157	Indian peafowl	Pavo cristatus	2	4	0	6
158	Green peafowl	Pavo muticus	2	3	0	5
159	Grey peacock pheasant	Polyplectron bicalcaratum	2	4	0	6
160	Kalij pheasant	Lophura leucomelanos	2	4	0	6
161	Cheer pheasant	Catreus wallichii	2	4	0	6
162	Himalayan monal	Lophophorus sclateri	2	4	0	6
163	Grey jungle fowl	Gallus sonneratii	2	4	0	6
164	Red jungle fowl	Gallus gallus	2	4	0	6
165	Grey francolin	Francolinus pondicerianus	2	3	0	5
166	Black francolin	Francolinus francolinus	2	3	0	5
167	Pheasant tailed jacana	Hydrophasianus chirurgus	5	5	0	10
168	Water hen	Amauornis phoenicurus	2	3	0	5
169	Black necked crane	Grus nigricollis	2	3	0	5
170	Sarus crane	Grus antigone	2	3	0	5
171	Purple moorhen	Porphyrio porphyrio	2	3	0	5
172	Rosy pelican	Pelecanus onocrotalus	3	5	0	8
173	Great white egret	Ardea alba	2	3	0	5
174	Paradise fly catcher	Terpsiphone paradisi	2	3	0	5
175	Indian treepie	Dendrocitta vagabunda	2	3	0	5
176	Indian hoopoe	Upupa epops	2	3	0	5
177	Great Indian hornbill	Buceros bicornis	2	4	0	6
179	Indian vulture	Gyps indicus	2	4	0	6
180	White-rumped vulture	Gyps bengalensis	2	4	0	6
181	Black shouldered kite	Elanus axillaris	2	3	0	5
182	Indian shikra	Accipiter badius	2	3	0	5
183	Shaheen falcon	Falco peregrinus peregrinator	2	3	0	5
184	Honey buzzard	Pernis ptilorhynchus	2	3	0	5
185	Common kestrel	Falco tinnunculus	2	3	0	5
186	Crested serpent eagle	Spilornis cheela	2	3	0	5
187	Peregrine falcon	Falco peregrinus	2	3	0	5

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
188	Little cormorant	Microcarbo niger	5	5	0	10
189	Darter	Anhinga melanogaster	5	5	0	10
190	Plum headed parakeets	Psittacula cyanocephala	4	10	0	14
191	Ring necked parakeet	Psittacula krameri	4	10	0	14
192	Alexander parakeet	Psittacula eupatria	4	10	0	14
193	Painted stork	Mycteria leucocephala	2	4	0	6
194	Open billed stork	Anastomus oscitans	2	3	0	5
195	Bar- headed goose	Anser indicus	2	3	0	5
196	Comb duck	Sarkidiornis sylvicola	2	3	0	5
197	Common coot	Fulica atra	5	5	0	10
198	Common pochard	Aythya ferina	2	3	0	5
199	Common shelduck	Tadorna tadorna	2	3	0	5
200	Garganey	Spatula querquedula	2	3	0	5
201	Greylag goose	Anser anser	2	3	0	5
202	Lesser whistling duck	Dendrocygna javanica	2	3	0	5
203	Little grebe	Tachybaptus ruficollis	2	3	0	5
204	Mallard	Anas platyrhynchos	2	3	0	5
205	Mute swan	Cygnus olor	2	3	0	5
206	Northern pin tail	Anas acuta	2	3	0	5
207	Spot-billed duck	Anas poecilorhyncha	2	3	0	5
208	White headed duck	Oxyura leucocephala	2	3	0	5
209	Common teal	Anas crecca	2	3	0	5
210	Lesser white-fronted goose	Anser erythropus	2	3	0	5
211	Ruddy shelduck	Tadorna ferruginea	2	3	0	5
212	Mandarin duck	Aix galericulata	2	3	0	5
<b>Exotic birds</b>						
213	Humboldt penguin	Spheniscus humboldti	2	4	0	6
214	Gentoos penguins	Pygoscelis papua	2	4	0	6
215	Magallanes penguin	Spheniscus magellanicus	2	4	0	6
216	Glossy cockatoos	Calyptorhynchus lathami	2	4	0	6
217	White tail cockatoos	Zanda latirostris	2	4	0	6
218	Red Vented cockatoos	Cacatua haematuropygia	2	4	0	6

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
219	St. Lucia Amazon's	Amazona versicolor	2	4	0	6
220	St. Vincent Amzaon's	Amazona guildingii	2	4	0	6
221	Chilean flamingo	Phoenicopterus chilensis	2	4	0	6
222	Harpy eagle	Harpia harpyja	2	4	0	6
223	Black and white hawk eagle	Spizaetus melanoleucus	2	4	0	6
224	Secretary bird	Sagittarius serpentarius	2	4	0	6
225	Quetzal	Pharomachrus sp.	2	4	0	6
226	Long-wattled umbrella bird	Cephalopterus penduliger	2	4	0	6
227	Cock of the Rock	Rupicola peruvianus	2	4	0	6
228	Horned guan	Oreophasis derbianus	2	4	0	6
229	Ring necked pheasant	Phasianus colchicus	2	3	0	5
230	Pale winged trumpeter	Psophia leucoptera	2	4	0	6
231	Shoebill stork	Balaeniceps rex	2	4	0	6
232	Ostrich	Struthio sp.	2	4	0	6
233	Keel Billed Toucans	Ramphastos sulfuratus	2	4	0	6
<b>Indigenous reptiles</b>						
234	Reticulated python	Malayopython reticulatus	2	4	0	6
235	Red sand boa	Eryx johnii	3	6	0	9
236	Whitaker's boa	Eryx whitakeri	3	6	0	9
237	Green vine snake	Ahaetulla prasina	3	6	0	9
238	Bronzeback tree snake	Dendrelaphis tristis	3	6	0	9
239	Rat snake	Ptyas mucosa	3	6	0	9
240	Common wolf snake	Lycodon capucinus	3	6	0	9
241	Barred wolf snake	Lycodon striatus	3	6	0	9
242	Striped keelback	Amphiesma stolatum	3	6	0	9
243	Green keelback	Rhabdophis plumbicolor	3	6	0	9
244	Checkered keelback	Fowlea piscator	3	6	0	9
245	Trinket snake	Coelognathus helena	3	6	0	9
246	Green cat snake	Boiga cyanea	3	6	0	9
247	Indian egg eater	Elachistodon westermanni	3	6	0	9
248	Forsten's cat snake	Boiga forsteni	3	6	0	9
249	Royal snake	Spalerosophis diadema	3	6	0	9

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
250	Bamboo rat Snake	Oreocryptophis porphyraceus	3	6	0	9
251	Ornate flying snake	Chrysopelea ornata	3	6	0	9
252	Copper headed trinket	Coelognathus radiatus	3	6	0	9
253	Spectacled cobra	Naja naja	3	6	0	9
254	Monocled cobra	Naja kaouthia	3	6	0	9
255	Common krait	Bungarus caeruleus	3	6	0	9
256	Russell's viper	Daboia russelii	3	6	0	9
257	Saw-scaled viper	Echis carinatus	3	6	0	9
258	Malabar pit viper	Trimeresurus malabaricus	3	6	0	9
259	Humpnosed pit viper	Hypnale hypnale	3	6	0	9
260	Green bronzeback	Dendrelaphis andamanensis	3	6	0	9
261	Stout sand snake	Psammophis longifrons	3	6	0	9
262	Leith's sand snake	Psammophis leithii	3	6	0	9
263	Indian smooth snake	Coronella brachyura	3	6	0	9
264	Olive keelback	Atretium schistosum	3	6	0	9
265	Andaman cat snake	Boiga andamanensis	3	6	0	9
266	Caspian/Black cobra	Naja oxiana	3	6	0	9
267	Andaman cobra	Naja sagittifera	3	6	0	9
268	Andaman pit viper	Trimeresurus andersonii	3	6	0	9
269	Wall's krait	Bungarus sindanus	3	6	0	9
270	Large scaled pit viper	Trimeresurus macrolepis	3	6	0	9
271	Gujarat racer	Wallaceophis gujaratensis	2	4	0	6
272	Burmese python	Python bivittatus	2	3	0	5
273	Common sand boa	Eryx conicus	2	3	0	5
274	Large eyed bronzeback	Dendrelaphis grandoculis	2	3	0	5
275	Yellow spotted wolf snake	Lycodon flavomaculatus	2	3	0	5
276	Condaranus sand snake	Psammophis condanarus	2	3	0	5
277	Common cat snake	Boiga trigonata	2	3	0	5
278	Sind long headed snake	Lytorhynchus paradoxus	2	3	0	5
279	Sochurek's sawscaled viper	Echis sochureki	2	3	0	5
280	Olive forest snake	Rhabdops olivaceus	2	3	0	5
281	Aquatic forest snake	Rhabdops aquaticus	2	3	0	5

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (continued)

Sl	Common Name	Scientific Name	M	F	U	T
282	Red necked keelback	Rhabdophis subminiatus	2	3	0	5
283	Mock viper	Psammodynastes pulverulentus	2	3	0	5
284	Red tailed trinket snake	Gonyosoma oxycephalum	2	3	0	5
285	Brown vine snake	Ahaetulla pulverulenta	2	3	0	5
286	Variable vine snake	Ahaetulla anomala	2	3	0	5
287	Andaman bronzeback	Dendrelaphis andamanensis	2	3	0	5
288	Common bridal snake	Lycodon nympha	2	3	0	5
289	Coral kukri	Oligodon kheriensis	2	3	0	5
290	Common kukri	Oligodon arnensis	2	3	0	5
291	Large scaled pitviper	Trimeresurus macrolepis	2	3	0	5
292	King cobra	Ophiophagus hannah	2	3	0	5
293	Red crowned roof turtle	Batagur kachuga	2	4	0	6
294	Northern river terrapin	Batagur baska	2	4	0	6
295	Black softshell turtle	Nilssonia nigricans	2	4	0	6
296	Spotted pond turtle	Geoclemys hamiltonii	2	4	0	6
297	Indian eyed turtle	Morenia petersi	2	4	0	6
298	Indian softshell turtle	Nilssonia gangetica	2	4	0	6
299	Peacock softshell turtle	Nilssonia hurum	2	4	0	6
300	Crowned river turtle	Hardella thurjii	2	4	0	6
301	Travancore tortoise	Indotestudo travancorica	2	4	0	6
302	Star tortoise	Geochelone elegans	2	4	0	6
303	Flapshell turtle	Lissemys punctata	2	4	0	6
304	Tricarinate hill tortoise	Melanochelys tricarinata	2	4	0	6
305	Elongated tortoise	Indotestudo elongata	2	4	0	6
306	Impressed tortoise	Manouria impressa	2	4	0	6
307	Three striped roof turtle	Batagur dhongoka	2	4	0	6
308	Asian box turtle	Cuora amboinensis	2	4	0	6
309	Asian gaint forest tortoise	Manouria emys	3	6	0	9
310	Bengal monitor	Varanus bengalensis	2	4	0	6
311	Yellow monitor	Varanus flavescens	2	4	0	6
312	Water monitor	Varanus salvator	2	4	0	6
313	Indian chameleon	Chamaeleo zeylanicus	2	4	0	6

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
314	Desert monitor	Varanus griseus	2	4	0	6
315	Gujarat house gecko	Hemidactylus gujaratensis	2	4	0	6
316	Kutch snake-eye lizard	Ophisops kutchensis	2	4	0	6
317	Spotted supple skink	Riopa albopunctata	2	4	0	6
318	Eastern sand swimmer/Three fingered sand fish	Ophiomorus raithmai	2	4	0	6
319	Keeled mabuya skink	Eutropis carinata	2	4	0	6
320	Spiny tailed lizard	Saara hardwickii	2	4	0	6
321	Indian fringe toed lizard	Acanthodactylus cantoris	2	4	0	6
322	Asian glass lizard	Dopasia gracilis	2	4	0	6
323	Eastern leopard gecko	Eublepharis hardwickii	2	4	0	6
324	Western leopard gecko	Eublepharis fuscus	2	4	0	6
325	Golden gecko	Calodactylodes aureus	2	4	0	6
326	Ornate day gecko	Cnemaspis ornata	2	4	0	6
327	Sind sand gecko	Crossobammon orientalis	2	4	0	6
328	Giri's geckoella	Cyrtodactylus varadgirii	2	4	0	6
329	Scaly gecko	Hemidactylus scabriceps	2	4	0	6
330	Andaman day gecko	Phelsuma andamanense	2	4	0	6
331	Dwarf ground lizard	Calotes minor	2	4	0	6
332	Nilgiri forest lizard	Calotes nemoricola	2	4	0	6
333	Persian dwarf gecko	Microgecko persicus	2	4	0	6
334	Poona mole skink	Eurylepis poonaensis	2	4	0	6
335	Vizag limbless skink	Barkudia melanosticta	2	4	0	6
336	Leopard gecko	Eublepharis macularius	2	4	0	6
337	Gharial	Gavialis gangeticus	2	8	0	10
338	Mugger	Crocodylus palustris	2	4	0	6
339	Saltwater crocodile	Crocodylus porosus	2	4	0	6
<b>Exotic reptiles</b>						
340	Aldabra giant tortoise	Aldabrachelys gigantea	2	4	0	6
341	Green basilisk	Basiliscus plumifrons	2	3	0	5
342	Blue tongued skink	Tiliqua sp.	2	3	0	5
343	Bearded dragon	Pogona sp.	2	3	0	5
344	Jackson's chameleon	Trioceros jacksonii	2	3	0	5

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (continued)

Sl	Common Name	Scientific Name	M	F	U	T
345	Green Iguana	Iguana iguana	2	3	0	5
346	Komodo dragon	Varanus komodoensis	2	3	0	5
347	Nile crocodile	Crocodylus niloticus	2	3	0	5
348	Dwarf caiman	Paleosuchus palpebrosus	2	3	0	5
349	Siamese crocodile	Crocodylus siamensis	2	3	0	5
350	American alligator	Alligator mississippiensis	2	3	0	5
351	Morelets crocodile	Crocodylus moreletii	2	3	0	5
<b>Amphibians</b>						
352	Crocodile newt	Tylotriton verrucosus	2	4	0	6
353	Chorla striped caecelian	Ichthyophis davidi	2	4	0	6
354	Bombay caecelian	Ichthyophis bombayensis	2	4	0	6
355	Eastern gegenophis	Genenophis orientalis	2	4	0	6
356	Marbled toad	Duttaphrynus stomaticus	2	4	0	6
357	Common toad	Duttaphrynus melanostictus	2	4	0	6
358	Malabar toad	Duttaphrynus hololius	2	4	0	6
359	Ornate stream toad	Ghatophryne ornata	2	4	0	6
360	Red stream toad	Ghatophryne rubigina	2	4	0	6
361	Amboli toad	Xanthophryne tigerina	2	4	0	6
362	Malabar tree toad	Pedostibes tuberculosus	2	4	0	6
363	Skittering frog	Euphlyctis cyanophlyctis	2	4	0	6
364	Indian bullfrog	Hoplobatrachus tigerinus	2	4	0	6
365	Indian burrowing frog	Sphaerotheca breviceps	2	4	0	6
366	Smith's leaf litter frog	Leptobrachium smithi	2	4	0	6
367	Kottigehar Dancing frog	Micrixalus kottigeharensis	2	4	0	6
368	Black microhylid frog	Melanobatrachus indicus	2	4	0	6
369	Ornate narrow mouthed frog	Microhyla ornata	2	4	0	6
370	Painted balloon frog	Uperodon taprobanicus	2	4	0	6
371	Variegated balloon frog	Uperodon variegatus	2	4	0	6
372	Marbled balloon frog	Uperodon systema	2	4	0	6
373	Indian balloon frog	Uperodon globulosus	2	4	0	6
374	Deccan night frog	Nyctibatrachus deccanensis	2	4	0	6
375	Beautiful torrent frog	Amolops formosus	2	4	0	6

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (continued)

Sl	Common Name	Scientific Name	M	F	U	T
376	Bicoloured frog	<i>Clinotarsus curtipes</i>	2	4	0	6
377	Fungoid frog	<i>Hydrophylax malabaricus</i>	2	4	0	6
378	Yellow striped frog	<i>Hylarana tytleri</i>	2	4	0	6
379	Star eyed tree frog	<i>Ghatixalus asterops</i>	2	4	0	6
380	Large ghats tree frog	<i>Ghatixalus magnus</i>	2	4	0	6
381	Common tree frog	<i>Polypedates maculatus</i>	2	4	0	6
382	Malabar gliding frog	<i>Rhacophorus malabaricus</i>	2	4	0	6
383	Common golden backed frog	<i>Indosylvirana indica</i>	2	4	0	6
384	Large golden backed frog	<i>Indosylvirana magna</i>	2	4	0	6
385	Beddome's bush frog	<i>Raorchestes beddomii</i>	2	4	0	6
386	Coorg yellow bush frog	<i>Raorchestes luteolus</i>	2	4	0	6
387	Ponmudi bush frog	<i>Raorchestes ponmudi</i>	2	4	0	6
388	Spotted leaping frog	<i>Sallywalkerana diplosticta</i>	2	4	0	6
389	Beddomes leaping frog	<i>Indirana beddomii</i>	2	4	0	6
390	Purple frog	<i>Nasikabatrachus sahyadrensis</i>	2	4	0	6
391	Lizard headed cricket frog	<i>Fejervarya sauriceps</i>	2	4	0	6
392	Myristica swamp frog	<i>Mercurana myristicapalustris</i>	2	4	0	6
<b>Insects</b>						
422	Common Banded awl	<i>Hasora chromus</i>	10	10	0	20
423	Oriental Palm bob	<i>Suastus gremius</i>	10	10	0	20
424	Grass demon	<i>Udaspes folus</i>	10	10	0	20
425	Rice swift	<i>Borbo cinnara</i>	10	10	0	20
426	Vindhyan bob	<i>Arnetta vindhiana</i>	10	10	0	20
427	Conjoined swift	<i>Pelopidas conjuncta</i>	10	10	0	20
428	Small branded swift	<i>Pelopidas mathias</i>	10	10	0	20
429	Indian sunbeam	<i>Curetis thetis</i>	10	10	0	20
430	Ape fly	<i>Spalgis epius</i>	10	10	0	20
431	Common hedge blue	<i>Acytolepis puspa</i>	10	10	0	20
432	African babul blue	<i>Azonus jesous</i>	10	10	0	20
433	Bright babul blue	<i>Azonus ubaldus</i>	10	10	0	20
434	Common pierrot	<i>Castalius rosimon</i>	10	10	0	20
435	Forget-me-not	<i>Catochrysops strabo</i>	10	10	0	20

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
436	Lime blue	Chilades lajus	10	10	0	20
437	Plain cupid	Luthrodes pandava	10	10	0	20
438	Small cupid	Chilades parthasius	10	10	0	20
439	Gram blue	Euchrysops cnejus	10	10	0	20
440	Indian cupid	Orange-crowned Cupid	10	10	0	20
441	Black-spotted grass jewel	Freyeria putli	10	10	0	20
442	Orange-spotted grass jewel	Freyeria trochylus	10	10	0	20
443	Dark cerulean	Jamides bochus	10	10	0	20
444	Pea blue	Lampides boeticus	10	10	0	20
445	Zebra blue	Leptotes plinius	10	10	0	20
446	Little tiger pierrot	Tarucus balkanica	10	10	0	20
447	Striped pierrot	Tarucus nara	10	10	0	20
448	Dark grass blue	Zizeeria karsandra	10	10	0	20
449	Lesser grass blue	Zizina otis	10	10	0	20
450	Tiny grass blue	Zizula hylax	10	10	0	20
451	Common silverline	Cigaritis vulcanus	10	10	0	20
452	Common shot silverline	Spindasis ictis	10	10	0	20
453	Common red flash	Rapala iarbus	10	10	0	20
454	Common castor	Ariadne merione	10	10	0	20
455	Anomalous nawab	Charaxes agrarius	10	10	0	20
456	Plain tiger	Danaus chrysippus	10	10	0	20
457	Striped tiger	Danaus genutia	10	10	0	20
458	Blue tiger	Tirumala limniace	10	10	0	20
459	Glassy tiger	Parantica aglea	10	10	0	20
460	Common crow	Euploea core	10	10	0	20
461	Tawny coster	Acraea terpsicore	10	10	0	20
462	Common leopard	Phalanta phalantha	10	10	0	20
463	Common baron	Euthalia aconthea	10	10	0	20
464	Baronet	Euthalia nais	10	10	0	20
465	Common sailer	Neptis hylas	10	10	0	20
466	Great eggfly	Hypolimnas bolina	10	10	0	20
467	Danaid eggfly	Hypolimnas misippus	10	10	0	20

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
468	Peacock pansy	Junonia almana	10	10	0	20
469	Blue pansy	Junonia orithya	10	10	0	20
470	Lemon pansy	Junonia lemonias	10	10	0	20
471	Yellow pansy	Junonia hierta	10	10	0	20
472	Painted lady	Vanessa cardui	10	10	0	20
473	Common evening brown	Melanitis leda	10	10	0	20
474	Common four-ring	Ypthima huebneri	10	10	0	20
475	Tailed jay	Graphium agamemnon	10	10	0	20
476	Common jay	Graphium doson	10	10	0	20
477	Spot swordtail	Graphium nomius	10	10	0	20
478	Lime butterfly	Papilio demoleus	10	10	0	20
479	Common mime	Papilio clytia	10	10	0	20
480	Red helen	Papilio helenus	10	10	0	20
481	Blue mormon	Papilio polymnestor	10	10	0	20
482	Common mormon	Papilio polytes	10	10	0	20
483	Common rose	Pachliopta aristolochiae	10	10	0	20
484	Common emigrant	Lemon Emigrant	10	10	0	20
485	Mottled emigrant	Catopsilia pyranthe	10	10	0	20
486	Small grass yellow	Eurema brigitta	10	10	0	20
487	Spotless grass yellow	Eurema laeta	10	10	0	20
488	Common grass yellow	Eurema hecabe	10	10	0	20
489	Common wanderer	Pareronia valeria	10	10	0	20
490	Common albatross	Appias albina	10	10	0	20
491	Western striped albatross	Appias libythea	10	10	0	20
492	Pioneer	Belenois aurota	10	10	0	20
493	Common gull	Cepora nerissa	10	10	0	20
494	Indian jezebel	Delias eucharis	10	10	0	20
495	Little orange-tip	Colotis etrida	10	10	0	20
496	Crimson-tip	Colotis danae	10	10	0	20
497	White orange-tip	Ixias marianne	10	10	0	20
498	Yellow orange-tip	Ixias pyrene	10	10	0	20

### Fishes

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
499	Malabar mahseer	Tor malabaricus	10	10	0	20
500	Tor mahseer	Tor tor	10	10	0	20
501	Giant gouramiă	Osphronemus goramy	10	10	0	20
502	Dwarf gouramiă	Trichogaster lalius	10	10	0	20
503	Fresh water ray	Urogymnus polylepis	10	10	0	20
504	Freshwater garfish	Xenentodon cancila	10	10	0	20
505	Ectuntio halfbeak	Zenarchopterus ectuntio	10	10	0	20
506	Malabar glassy perchlet	Ambassis dussumieri	10	10	0	20
507	Gangetic koi	Anabas cobojus	10	10	0	20
508	Climbing perch	Anabas testudineus	10	10	0	20
509	Indian longfin eel	Anguilla bengalensis	10	10	0	20
510	Spotted catfish	Arius maculatus	10	10	0	20
511	Short nosed catfish	Arius subrostratus	10	10	0	20
512	Scribbled goby	Awaous grammepomus	10	10	0	20
513	Goonch	Bagarius yarrelli-	10	10	0	20
514	Slender stone loach	Balitora mysorensis	10	10	0	20
515	Murree labeo	Bangana diplostoma	10	10	0	20
516	Carnatica carp	Hypselobarbus carnaticus	10	10	0	20
517	Bili-meenu	Tor khudree	10	10	0	20
518	Malabar baril	Barilius bakeri	10	10	0	20
519	Jerdon's baril	Barilius bakeri	10	10	0	20
520	Batasio	Batasio batasio	10	10	0	20
521	Birdi loach	Botia birdi	10	10	0	20
522	Necktie loach	Botia dario	10	10	0	20
523	Burmese loach	Balitora burmanica	10	10	0	20
524	Y-loach	Botia lohachata	10	10	0	20
525	Tiger loach	Syncrossus hymenophysa	10	10	0	20
526	Oriental-sole	Brachirus orientalis	10	10	0	20
527	Malabar pufferfish	Carinotetraodon travancoricus	10	10	0	20
528	Bothua	Channa gachua	10	10	0	20
529	Bullseye snakehead	Channa marulius	10	10	0	20
530	Malabar snakehead	Channa diplogramma	10	10	0	20

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
531	Asiatic snakehead	<i>Channa orientalis</i>	10	10	0	20
532	Spotted snakehead	<i>Channa punctata</i>	10	10	0	20
533	Banded snakeheadă	<i>Channa striata</i>	10	10	0	20
534	Milkfish	<i>Chanos chanos</i>	10	10	0	20
535	Tade mullet	<i>Planiliza planiceps</i>	10	10	0	20
536	Mrigal	<i>Cirrhinus cirrhosus</i>	10	10	0	20
537	Magură	<i>Clarias batrachus</i>	10	10	0	20
538	Valenciennes clariidă	<i>Clarias dussumieri</i>	10	10	0	20
539	Assamese kingfishă	<i>Cyprinion semiplotum</i>	10	10	0	20
540	Zebra danio	<i>Danio rerio</i>	10	10	0	20
541	Silas barb	<i>Dawkinsia arulius</i>	10	10	0	20
542	Black-spot barb	<i>Dawkinsia filamentosa</i>	10	10	0	20
543	Rosy barb	<i>Pethia conchonius</i>	10	10	0	20
544	Melon barb	<i>Haludaria fasciata</i>	10	10	0	20
545	Giant danio	<i>Devario aequipinnatus</i>	10	10	0	20
546	Malabar danio	<i>Devario malabaricus</i>	10	10	0	20
547	Burmese pufferfish	<i>Tetraodon nigroviridis</i>	10	10	0	20
548	Green chromide	<i>Etroplus suratensis</i>	10	10	0	20
549	Mullya garra	<i>Garra mullya</i>	10	10	0	20
550	ăCatla	<i>Gibelion catla</i>	10	10	0	20
551	Jerdon's carp	<i>Hypselobarbus jerdoni</i>	10	10	0	20
552	Kolus	<i>Hypselobarbus kolus</i>	10	10	0	20
553	Korhi barb	<i>Hypselobarbus micropogon</i>	10	10	0	20
554	Karnataka labeo	<i>Labeo calbasu</i>	10	10	0	20
555	Nandani	<i>Labeo nandina</i>	10	10	0	20
556	Roho labeo	<i>Labeo rohita</i>	10	10	0	20
557	Yellow banded spiny eel	<i>Macrognathus fasciatus</i>	10	10	0	20
558	Malabar spinyee	<i>Macrognathus guentheri</i>	10	10	0	20
559	Kerala mystus	<i>Mystus keralai</i>	10	10	0	20
560	Gangetic mystus	<i>Mystus cavasius</i>	10	10	0	20
561	Long-whiskered catfish	<i>Sperata aor</i>	10	10	0	20
562	Keletius mystus	<i>Mystus keletius</i>	10	10	0	20

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
563	Bengal mudeel	Ophisternon bengalense	10	10	0	20
564	Chandkas barb	Osteochilus nashii	10	10	0	20
565	Canine catfish-eel	Plotosus canius	10	10	0	20
566	Wayanad leaffish	Pristolepis pentacantha	10	10	0	20
567	Scarlet-banded barb	Puntius amphibius	10	10	0	20
568	Long fin Kerala barb	Puntius dolichopterus	10	10	0	20
569	Denison barb	Sahyadria denisonii	10	10	0	20
570	Spotted scat	Scatophagus argus	10	10	0	20
571	Red finned kuruva	Systemus rufus	10	10	0	20
572	Peninsular olive barb	Systemus sarana	10	10	0	20
573	Kakilaä	Xenentodon cancila	10	10	0	20
574	Rita	Rita rita	10	10	0	20
575	Vagra baril	Barilius vagra	10	10	0	20
576	Mud skipper	Boleophthalmus dussumier	10	10	0	20
577	Almorha loach	Botia almorhae	10	10	0	20
578	Gangetic ailiaä	Ailia coila	10	10	0	20
579	Commerson's glassy perchlet	Ambassis ambassis	10	10	0	20
580	Burmese carplet	Amblypharyngodon atkinsonii	10	10	0	20
581	Attentive carplet	Amblypharyngodon melettinus	10	10	0	20
582	Indian carplet	Amblypharyngodon microlepi	10	10	0	20
583	Mola carplet	Amblypharyngodon mola	10	10	0	20
584	Shortfin eelä	Anguilla bicolor	10	10	0	20
585	Green panchax	Aplocheilus blockii	10	10	0	20
586	Malabar killie	Aplocheilus lineatus	10	10	0	20
587	Blue panchax	Aplocheilus panchax	10	10	0	20
588	Scribbled sp.	Awaous guamensis	10	10	0	20
589	Gangetic goonch	Bagarius bagarius	10	10	0	20
590	Silent Valley stone loach	Balitora jalpalli	10	10	0	20
591	Palmas stone loach	Balitora laticauda	10	10	0	20
592	Gangetic latia	Crossocheilus latius	10	10	0	20
593	Karimpachiä	Crossocheilus periyarensis	10	10	0	20
594	Indian paradisefish	Ctenops nobilis	10	10	0	20

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
595	Green pufferfish	Dichotomyctere fluviatilis	10	10	0	20
596	Patharchatta	Glyptothorax annandalei	10	10	0	20
597	Travancore rock catfish	Glyptothorax elankadensis	10	10	0	20
598	Kalkkari	Glyptothorax housei	10	10	0	20
599	Kalkkari sp.	Glyptothorax sp.	10	10	0	20
600	Freshwater moray	Gymnothorax tile	10	10	0	20
601	Menoda catfish	Hemibagrus menoda	10	10	0	20
602	Thelee	Heteropneustes microps	10	10	0	20
603	Günther's catfish	Horabagrus brachysoma	10	10	0	20
604	Black horabagrus	Horabagrus melanosoma	10	10	0	20
605	Manjakoori	Horabagrus nigricollaris	10	10	0	20
606	Congaturi halfbeak	Hyporhamphus limbatus	10	10	0	20
607	Red tipped half-beak	Hyporhamphus xanthopterus	10	10	0	20
608	Curmuca barb	Hypselobarbus curmuca	10	10	0	20
609	Krishna carp	Hypselobarbus dobsoni	10	10	0	20
610	Mussullah mahseer	Hypselobarbus mussullah	10	10	0	20
611	Mahseer sp.	Tor sp.	10	10	0	20
612	Cat fish sp.	Plicofollis dussumieri	10	10	0	20
613	Rock flagtail	Kuhlia rupestris	10	10	0	20
614	Angra labeo	Labeo angra	10	10	0	20
615	Bata labeo	Labeo bata	10	10	0	20
616	Boga labeo	Labeo boga	10	10	0	20
617	Thooli	Labeo dussumieri	10	10	0	20
618	Fringed-lipped peninsula carpă	Labeo fimbriatus	10	10	0	20
619	Kuria labeo	Labeo gonius	10	10	0	20
620	Deccan labeo	Labeo kawrus	10	10	0	20
621	Pigmouth carp	Labeo kontius	10	10	0	20
622	Pangusia labeo	Labeo pangusia	10	10	0	20
623	Bombay labeoă	Labeo porcellus	10	10	0	20
624	Rajasthan labeoă	Labeo rajasthanicus	10	10	0	20
625	Ocellated pufferfish	Leiodon cutcutia	10	10	0	20
626	Marine ray	Batoidea sp.	10	10	0	20

Table 11.7: Approved Animal Collection Plan of GZRRC(26.10.2021) (*continued*)

Sl	Common Name	Scientific Name	M	F	U	T
627	Tire-track spinyeelă	Mastacembelus armatus	10	10	0	20
628	Oxeye tarpon	Megalops cyprinoides	10	10	0	20
629	Bengala barb	Megarasbora elanga	10	10	0	20
630	Short-tailed pipefish	Microphis brachyurus	10	10	0	20
631	Crocodile-tooth pipefishă	Microphis cuncalus	10	10	0	20
632	Deocata pipefish	Microphis deocata	10	10	0	20
633	Cuchia	Monopterus cuchia	10	10	0	20
634	Flathead mullet	Mugil cephalus	10	10	0	20
635	Feather back	Notopterus notopterus	10	10	0	20
636	Indian butter-catfish	Ompok bimaculatus	10	10	0	20
637	Goan catfish	Ompok malabaricus	10	10	0	20
638	Flathead sleeper	Ophiocara porocephala	10	10	0	20

## **Annexure IV- Free living Fauna of Greens Zoological Rescue and Rehabilitation Centre**



Sl No.	Common Name	Scientific Name
<b>Butterflies</b>		
1	Blue tiger	<i>Tirumala limniace</i>
2	Common grass dart	<i>Taractrocera maevius</i>
3	Common mormon	<i>Papilio polytes</i>
4	Common sailor	<i>Neptis hylas</i>
5	Lemon pansy	<i>Junonia lemonias</i>
6	Yellow pansy	<i>Junonia hierta</i>
7	Common club tail	<i>Ictinogomphus rapax</i>
8	Ground skimmer	<i>Diplacodes trivialis</i>
9	Wandering glider	<i>Pantala flavescens</i>
<b>Dragonflies</b>		
1	Golden dartlet	<i>Ischnura aurora</i>
2	Yellow bush dart	<i>Copera marginipes</i>
<b>Amphibians</b>		
1	Common Indian toad	<i>Duttaphrynus melanostictus</i>
2	Cricket frog	<i>Minervarya sp.</i>
3	Indian bull-frog	<i>Hoplobatrachus tigerinus</i>
4	Indian burrowing frog	<i>Sphaerotheca breviceps</i>
5	Painted kaloula	<i>Uperodon taprobanicus</i>
6	Schneider's toad	<i>Duttaphrynus stomaticus</i>
7	Skittering frog	<i>Euphlyctis cyanophlyctis</i>
8	Narrow mouthed frog	<i>Microhyla sp.</i>
9	Indian balloon frog	<i>Uperodon globulosus</i>
<b>Reptiles</b>		
1	Asian house gecko	<i>Hemidactylus frenatus</i>
2	Banded racer	<i>Argyrogena fasciolata</i>
3	Bengal monitor	<i>Varanus bengalensis</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
4	Bronze-back tree snake	<i>Dendrelaphis tristis</i>
5	Brooke's house gecko	<i>Hemidactylus brookii</i>
6	Checkered keelback	<i>Fowlea piscator</i>
7	Common cat snake	<i>Boiga trigonata</i>
8	Common krait	<i>Bungarus caeruleus</i>
9	Common sand boa	<i>Eryx conicus</i>
10	Common skink	<i>Mabuya carinata</i>
11	Common wolf snake	<i>Lycodon aulicus</i>
12	Fan-throated lizard	<i>Sitana ponticeriana</i>
13	Garden lizard	<i>Calotes versicolor</i>
14	Indian cobra	<i>Naja naja</i>
15	Indian flapshell turtle	<i>Lissemys punctata</i>
16	Leith's sand snake	<i>Psammophis leithii</i>
17	Lineated writhing skink	<i>Riopa lineata</i>
18	Rat snake	<i>Ptyas mucosa</i>
19	Red sand boa	<i>Eryx johnii</i>
20	Russell's viper	<i>Daboia russelii</i>
21	Saw scaled viper	<i>Echis carinatus</i>
22	Sind krait	<i>Bungarus sindanus</i>
23	Sochureks saw scaled viper	<i>Echis carinatus sochureki</i>
24	Spectacled cobra	<i>Naja naja</i>
25	Star tortoise	<i>Geochelone elegans</i>
26	Striped keelback	<i>Amphiesma stolatum</i>
27	Trinket snake	<i>Coelognathus helena</i>

Sl No.	Common Name	Scientific Name
<b>Birds</b>		
1	Alexandrine parakeet	<i>Palaeornis eupatria</i>
2	Ashy drongo	<i>Dicrurus leucophaeus</i>
3	Ashy prinia	<i>Prinia socialis</i>
4	Ashy-crowned sparrow-lark	<i>Eremopterix griseus</i>
5	Asian Desert Warbler	<i>Curruca nana</i>
6	Asian green bee-eater	<i>Merops orientalis</i>
7	Asian openbill	<i>Anastomus oscitans</i>
8	Asian palm-swift	<i>Cypsiurus balasiensis</i>
9	Asian plain Martin	<i>Riparia chinensis</i>
10	Asian woollyneck	<i>Ciconia episcopus</i>
11	Baillon's crake	<i>Zapornia pusilla</i>
12	Bank myna	<i>Acridotheres ginginianus</i>
13	Sand martin	<i>Riparia riparia</i>
14	Bar-headed goose	<i>Anser indicus</i>
15	Barn swallow	<i>Hirundo rustica</i>
16	Bar-tailed godwit	<i>Limosa lapponica</i>
17	Baya weaver	<i>Ploceus philippinus</i>
18	Bay-backed shrike	<i>Lanius vittatus</i>
19	Black bittern	<i>Ixobrychus flavicollis</i>
20	Black drongo	<i>Dicrurus macrocercus</i>
21	Black kite	<i>Milvus migrans</i>
22	Black redstart	<i>Phoenicurus ochruros</i>
23	Black stork	<i>Ciconia nigra</i>
24	Black tern	<i>Chlidonias niger</i>
25	Black-crowned night-heron	<i>Nycticorax nycticorax</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
26	Black-headed bunting	<i>Emberiza melanocephala</i>
27	Black-headed gull	<i>Larus ridibundus</i>
28	Black-headed Ibis	<i>Threskiornis melanocephalus</i>
29	Black-naped monarch	<i>Hypothymis azurea</i>
30	Black-necked grebe	<i>Podiceps nigricollis</i>
31	Black-necked stork	<i>Ephippiorhynchus asiaticus</i>
32	Black-tailed godwit	<i>Limosa limosa</i>
33	Black-winged kite	<i>Elanus caeruleus</i>
34	Black-winged stilt	<i>Himantopus himantopus</i>
35	Blue-cheeked bee-eater	<i>Merops persicus</i>
36	Blue-tailed bee-eater	<i>Merops philippinus</i>
37	Bluethroat	<i>Cyanecula svecica</i>
38	Blyth's reed-warbler	<i>Acrocephalus dumetorum</i>
39	Bonelli's eagle	<i>Aquila fasciata</i>
40	Booted eagle	<i>Hieraaetus pennatus</i>
41	Brahminy kite	<i>Haliastur indus</i>
42	Broad-billed sandpiper	<i>Calidris falcinellus</i>
43	Bronze-winged jacana	<i>Metopidius indicus</i>
44	Brown crane	<i>Zapornia akool</i>
45	Brown rockchat	<i>Oenanthe fusca</i>
46	Brown shrike	<i>Lanius cristatus</i>
47	Brown-breasted flycatcher	<i>Muscicapa muttui</i>
48	Caspian tern	<i>Hydroprogne caspia</i>
49	Cattle egret	<i>Bubulcus ibis</i>
50	Chestnut-bellied sandgrouse	<i>Pterocles exustus</i>
51	Chestnut-shouldered petronia	<i>Gymnoris xanthocollis</i>
52	Chestnut-tailed starling	<i>Sturnia malabarica</i>

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<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
53	Cinnamon bittern	<i>Ixobrychus cinnamomeus</i>
54	Citrine wagtail	<i>Motacilla citreola</i>
55	Clamorous reed-warbler	<i>Acrocephalus stentoreus</i>
56	Collared pratincole	<i>Glareola pratincola</i>
57	Common babbler	<i>Argya caudata</i>
58	Common barn-owl	<i>Tyto alba</i>
59	Common chiffchaff	<i>Phylloscopus collybita</i>
60	Common coot	<i>Fulica atra</i>
61	Common crane	<i>Grus grus</i>
62	Common greenshank	<i>Tringa nebularia</i>
63	Common gull-billed Tern	<i>Gelochelidon nilotica</i>
64	Common hawk-cuckoo	<i>Hierococcyx varius</i>
65	Common hoopoe	<i>Upupa epops</i>
66	Common iora	<i>Aegithina tiphia</i>
67	Common kestrel	<i>Falco tinnunculus</i>
68	Common kingfisher	<i>Alcedo atthis</i>
69	Eurasian moorhen	<i>Gallinula chloropus</i>
70	Common myna	<i>Acridotheres tristis</i>
71	Common pochard	<i>Aythya ferina</i>
72	Common swift	<i>Apus apus</i>
73	Common quail	<i>Coturnix coturnix</i>
74	Common redshank	<i>Tringa totanus</i>
75	Common ringed plover	<i>Charadrius hiaticula</i>
76	Common rosefinch	<i>Carpodacus erythrinus</i>
77	Common sandpiper	<i>Actitis hypoleucos</i>
78	Common snipe	<i>Gallinago gallinago</i>
79	Common starling	<i>Sturnus vulgaris</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
80	Common stonechat	<i>Saxicola torquatus</i>
81	Common tailorbird	<i>Orthotomus sutorius</i>
82	Common teal	<i>Anas crecca</i>
83	Common woodshrike	<i>Tephrodornis pondicerianus</i>
84	Coppersmith barbet	<i>Psilopogon haemacephalus</i>
85	Cotton pygmy-goose	<i>Nettapus coromandelianus</i>
86	Crab-plover	<i>Dromas ardeola</i>
87	Crested lark	<i>Galerida cristata</i>
88	Crested serpent-eagle	<i>Spilornis cheela</i>
89	Curlew sandpiper	<i>Calidris ferruginea</i>
90	Dalmatian pelican	<i>Pelecanus crispus</i>
91	Indian graceful prinia	<i>Prinia gracilis</i>
92	Demoiselle crane	<i>Anthropoides virgo</i>
93	Desert wheatear	<i>Oenanthe deserti</i>
94	Dunlin	<i>Calidris alpina</i>
95	Dusky crag martin	<i>Ptyonoprogne concolor</i>
96	Eastern orphean warbler	<i>Curruca crassirostris</i>
97	Eurasian collared-dove	<i>Streptopelia decaocto</i>
98	Eurasian curlew	<i>Numenius arquata</i>
99	Eurasian hobby	<i>Falco subbuteo</i>
100	Eurasian oystercatcher	<i>Haematopus ostralegus</i>
101	Eurasian sparrowhawk	<i>Accipiter nisus</i>
102	Eurasian spoonbill	<i>Platalea leucorodia</i>
103	Eurasian thick-knee	<i>Burhinus oedicnemus</i>
104	Eurasian wigeon	<i>Mareca penelope</i>
105	Eurasian wryneck	<i>Jynx torquilla</i>
106	European roller	<i>Coracias garrulus</i>

<b>Sl No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
107	Ferruginous duck	<i>Aythya nyroca</i>
108	Forest wagtail	<i>Dendronanthus indicus</i>
109	Gadwall	<i>Mareca strepera</i>
110	Garganey	<i>Spatula querquedula</i>
111	Glossy ibis	<i>Plegadis falcinellus</i>
112	Great cormorant	<i>Phalacrocorax carbo</i>
113	Great crested grebe	<i>Podiceps cristatus</i>
114	Great grey shrike	<i>Lanius excubitor</i>
115	Great thick-knee	<i>Esacus recurvirostris</i>
116	Great white egret	<i>Ardea alba</i>
117	Great white pelican	<i>Pelecanus onocrotalus</i>
118	Greater coucal	<i>Centropus sinensis</i>
119	Greater flamingo	<i>Phoenicopterus roseus</i>
120	Greater painted-snipe	<i>Rostratula benghalensis</i>
121	Greater sandplover	<i>Charadrius leschenaultii</i>
122	Greater short-toed Lark	<i>Calandrella brachydactyla</i>
123	Greater spotted eagle	<i>Clanga clanga</i>
124	Green sandpiper	<i>Tringa ochropus</i>
125	Green warbler	<i>Phylloscopus nitidus</i>
126	Little heron	<i>Butorides striata</i>
127	Grey francolin	<i>Francolinus pondicerianus</i>
128	Grey heron	<i>Ardea cinerea</i>
129	Grey wagtail	<i>Motacilla cinerea</i>
130	Grey-breasted prinia	<i>Prinia hodgsonii</i>
131	Grey-headed canary-flycatcher	<i>Culicicapa ceylonensis</i>
132	Greylag goose	<i>Anser anser</i>
133	Grey-necked bunting	<i>Emberiza buchanani</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
134	House crow	<i>Corvus splendens</i>
135	House sparrow	<i>Passer domesticus</i>
136	Hume's warbler	<i>phylloscopus humei</i>
137	Hypocolius	<i>Hypocolius ampelinus</i>
138	Indian bushlark	<i>Mirafra erythroptera</i>
139	Indian cormorant	<i>Phalacrocorax fuscicollis</i>
140	Indian courser	<i>Cursorius coromandelicus</i>
141	Indian golden oriole	<i>Oriolus kundoo</i>
142	Indian nightjar	<i>Caprimulgus asiaticus</i>
143	Indian paradise-flycatcher	<i>Terpsiphone paradisi</i>
144	Indian peafowl	<i>Pavo cristatus</i>
145	Indian pond-heron	<i>Ardeola grayii</i>
146	Indian robin	<i>Saxicoloides fulicatus</i>
147	Indian roller	<i>Coracias benghalensis</i>
148	Indian silverbill	<i>Euodice malabarica</i>
149	Indian skimmer	<i>Rynchops albicollis</i>
150	Indian spot-billed Duck	<i>Anas poecilorhyncha</i>
151	Indian thick-knee	<i>Burhinus indicus</i>
152	Indian white-eye	<i>Zosterops palpebrosus</i>
153	Intermediate egret	<i>Ardea intermedia</i>
154	Isabelline shrike	<i>Lanius isabellinus</i>
155	Jack snipe	<i>Lymnocyptes minimus</i>
156	Jacobin cuckoo	<i>Clamator jacobinus</i>
157	Kentish plover	<i>Charadrius alexandrinus</i>
158	Knob-billed duck	<i>Sarkidiornis melanotos</i>
159	Large grey babbler	<i>Argya malcolmi</i>
160	Laughing dove	<i>Spilopelia senegalensis</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
161	Lesser black-backed Gull	<i>Larus fuscus</i>
162	Lesser crested tern	<i>Thalasseus bengalensis</i>
163	Lesser flamingo	<i>Phoeniconaias minor</i>
164	Lesser sandplover	<i>Charadrius mongolus</i>
165	Lesser whistling-duck	<i>Dendrocygna javanica</i>
166	Lesser whitethroat	<i>Curruca curruca</i>
167	Little cormorant	<i>Microcarbo niger</i>
168	Little egret	<i>Egretta garzetta</i>
169	Little grebe	<i>Tachybaptus ruficollis</i>
170	Small pratincole	<i>Glareola lactea</i>
171	Little ringed plover	<i>Charadrius dubius</i>
172	Little stint	<i>Calidris minuta</i>
173	Little swift	<i>Apus affinis</i>
174	Little tern	<i>Sternula albifrons</i>
175	Long-billed pipit	<i>Anthus similis</i>
176	Long-legged buzzard	<i>Buteo rufinus</i>
177	Long-tailed shrike	<i>Lanius schach</i>
178	Mallard	<i>Anas platyrhynchos</i>
179	Marsh sandpiper	<i>Tringa stagnatilis</i>
180	Montagu's harrier	<i>Circus pygargus</i>
181	Northern pintail	<i>Anas acuta</i>
182	Northern shoveler	<i>Spatula clypeata</i>
183	Oriental darter	<i>Anhinga melanogaster</i>
184	Oriental honey-buzzard	<i>Pernis ptilorhynchus</i>
185	Oriental magpie-robin	<i>Copsychus saularis</i>
186	Osprey	<i>Pandion haliaetus</i>
187	Pacific golden plover	<i>Pluvialis fulva</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
188	Paddy field pipit	<i>Anthus rufulus</i>
189	Painted stork	<i>Mycteria leucocephala</i>
190	Pale sand martin	<i>Riparia diluta</i>
191	Pallas's gull	<i>Larus ichthyaetus</i>
192	Pallid harrier	<i>Circus macrourus</i>
193	Peregrine falcon	<i>Falco peregrinus</i>
194	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>
195	Pied bushchat	<i>Saxicola caprata</i>
196	Pied kingfisher	<i>Ceryle rudis</i>
197	Plain prinia	<i>Prinia inornata</i>
198	Plum-headed parakeet	<i>Himalayapsitta cyanocephala</i>
199	Purple heron	<i>Ardea purpurea</i>
200	Purple-rumped sunbird	<i>Leptocoma zeylonica</i>
201	Purple sunbird	<i>Cinnyris asiaticus</i>
202	Purple swamphen	<i>Porphyrio porphyrio</i>
203	Rain quail	<i>Coturnix coromandelica</i>
204	Red avadavat	<i>Amandava amandava</i>
205	Red turtle-dove	<i>Streptopelia tranquebarica</i>
206	Red-breasted flycatcher	<i>Ficedula parva</i>
207	Red-crested pochard	<i>Netta rufina</i>
208	Red-naped ibis	<i>Pseudibis papillosa</i>
209	Red-necked falcon	<i>Falco ruficollis</i>
210	Red-rumped swallow	<i>Cecropis daurica</i>
211	Red-vented bulbul	<i>Pycnonotus cafer</i>
212	Red-wattled lapwing	<i>Vanellus indicus</i>
213	River tern	<i>Sterna aurantia</i>
214	Rock bush-quail	<i>Perdicula argoondah</i>

<b>SI No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
215	Rock pigeon	<i>Columba livia</i>
216	Rose-ringed parakeet	<i>Alexandrinus krameri</i>
217	Rosy starling	<i>Pastor roseus</i>
218	Ruddy shelduck	<i>Tadorna ferruginea</i>
219	Ruddy turnstone	<i>Arenaria interpres</i>
220	Ruff	<i>Calidris pugnax</i>
221	Rufous treepie	<i>Dendrocitta vagabunda</i>
222	Rufous-fronted prinia	<i>Prinia buchanani</i>
223	Rufous-tailed lark	<i>Ammomanes phoenicura</i>
224	Sand lark	<i>Alaudala raytal</i>
225	Sanderling	<i>Calidris alba</i>
226	Sandwich tern	<i>Thalasseus sandvicensis</i>
227	Shikra	<i>Accipiter badius</i>
228	Slender-billed gull	<i>Larus genei</i>
229	Small minivet	<i>Pericrocotus cinnamomeus</i>
230	Spotted dove	<i>Spilopelia chinensis</i>
231	Spotted owlet	<i>Athene brama</i>
232	Steppe eagle	<i>Aquila nipalensis</i>
233	Streak-throated swallow	<i>Petrochelidon fluvicola</i>
234	Sykes's lark	<i>Galerida deva</i>
235	Sykes's warbler	<i>Iduna rama</i>
236	Tawny pipit	<i>Anthus campestris</i>
237	Temminck's stint	<i>Calidris temminckii</i>
238	Tree pipit	<i>Anthus trivialis</i>
239	Tufted duck	<i>Aythya fuligula</i>
240	Asian koel	<i>Eudynamys scolopaceus</i>
241	Western reef-egret	<i>Egretta gularis</i>

<b>Sl No.</b>	<b>Common Name</b>	<b>Scientific Name</b>
242	Western yellow wagtail	<i>Motacilla flava</i>
243	Whiskered tern	<i>Chlidonias hybrida</i>
244	White bellied swiftlet	<i>Collocalia esculenta</i>
245	White stork	<i>Ciconia ciconia</i>
246	White wagtail	<i>Motacilla alba</i>
247	White-breasted waterhen	<i>Amaurornis phoenicurus</i>
248	White-browed fantail	<i>Rhipidura aureola</i>
249	White-browed wagtail	<i>Motacilla maderaspatensis</i>
250	White-throated kingfisher	<i>Halcyon gularis</i>
251	Wire-tailed swallow	<i>Hirundo smithii</i>
252	Yellow-footed green-pigeon	<i>Treron phoenicopterus</i>
253	Yellow-wattled lapwing	<i>Vanellus malabaricus</i>
<b>Mammals</b>		
1	Indian grey mongoose	<i>Herpestes edwardsii</i>
2	Indian palm squirrel	<i>Funambulus palmarum</i>
3	Indian porcupine	<i>Hystrix indica</i>
4	Nilgai	<i>Boselaphus tragocamelus</i>
5	Black naped hare	<i>Lepus nigricollis</i>
6	Wild boar	<i>Sus scrofa cristatus</i>
7	Golden jackal	<i>Canis aureus</i>

## **Annexure V- Organization Structure of Greens Zoological Rescue and Rehabilitation Centre**

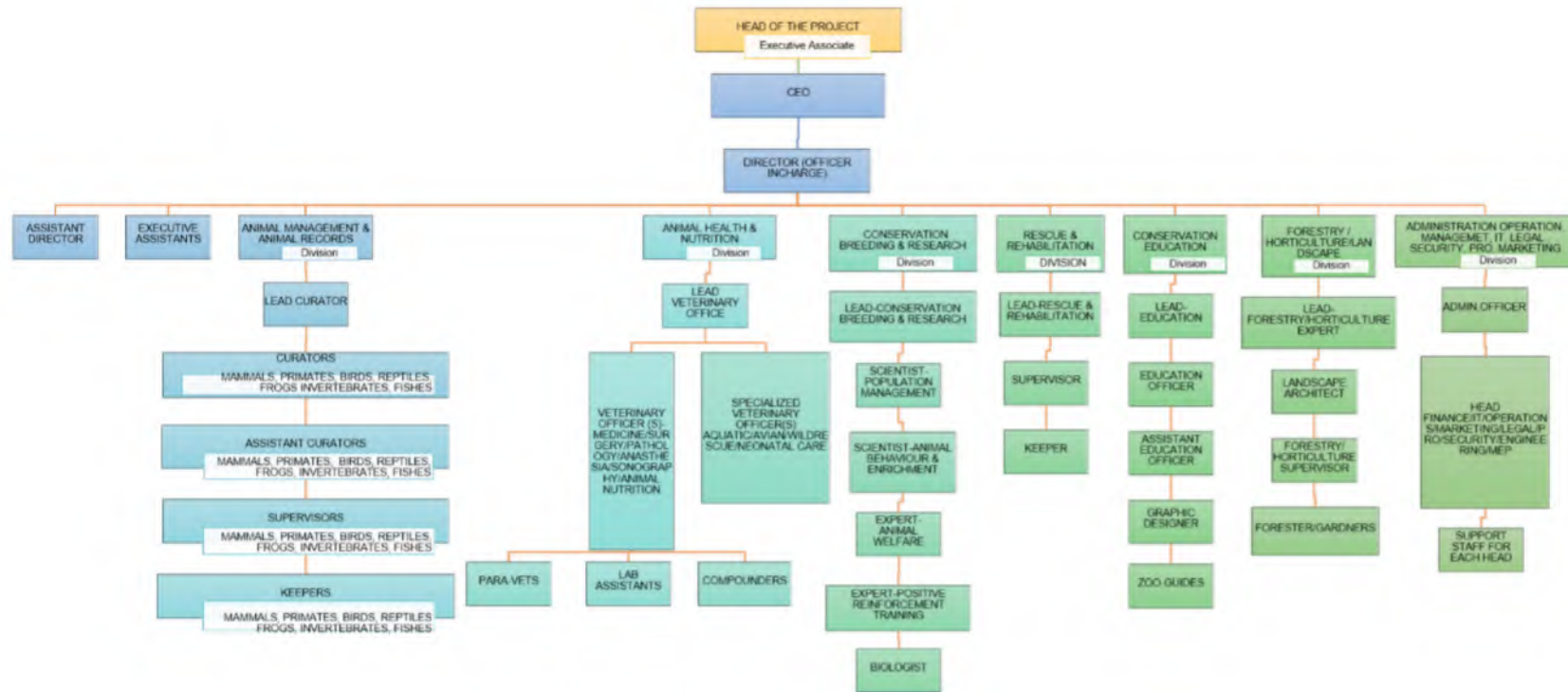


Figure 11.10: Organization Structure of Greens Zoological Rescue and Rehabilitation Centre

## **Annexures VI - List of Buildings**

<b>SI No</b>	<b>Name of Building</b>	<b>Numbers</b>
1.	Administration	1
2.	Entrance	1
3.	Security and Ticketing	1
4.	Tram Stations	1
5.	VIP station	1
6.	Water Management and Aquatic Zone	1
7.	Public Toilets	3
8.	Souvenir Shops	3
9.	Tunnel for Tram	4
10.	Entrance and Exit Tunnels	1
11.	Retail and Food Kiosks	3
12.	Viewing Tower	1
13.	Viewing Galleries	17
14.	Animal Hospital	1
15.	Incinerator	1
16.	Waste Management	1
17.	Back of the House	1
18.	Water Tank	1
19.	Power Station	1
20.	Pump and Filtration station for aquatic Zone	1

**Annexure VII - Registration of Greens Zoological Rescue  
and Rehabilitation Centre Society**



No.

022181

Spl./R./S.1g.

નોંધણીનો દાખલો

સને ૧૮૬૦ નો મંડળીઓની નોંધણી કાયદાનો અધિનિયમ

(સને ૧૮૬૦નો ૨૧મો અધિનિયમ)

નોંધણી નંબર ૨૨૪/૨૨૨૩૮/૧૯૬૦/૧૮૬

આથી દાખલો આપવામાં આવે છે કે Greens Zoological  
Rescue and Rehabilitation Centre <sup>society</sup>

બંધ ૨૦૧૩/૨૦૨૧ તારીખે, મંડળીઓની નોંધણી કાયદાના (સને ૧૮૬૦નો ૨૧મો)  
અધિનિયમ અન્વયે, યોગ્ય રીતે નોંધવામાં આવી છે.

મૂળ સહીનો તારખ ૧૦ મહિને ૦૩ સને ૨૦ ૨૧ને દિન ગા.નં.



મંડળીઓની નોંધણીના અધિકારને સંકેતિત, 10/8/21

*Rajal*

10/8/21

સિલબ

૨/૯ મંડળીઓની નોંધણીના અધિકારને સંકેતિત  
અધિકારીનું નામ, અધિકાર



**Annexure VIII- Greens Zoological Rescue and Rehabilitation  
Centre Health Advisory Committee**



**GREENS ZOOLOGICAL, RESCUE AND REHABILITATION CENTRE SOCIETY (GZRRC)**  
(Regd. No. Guj/21738/Ahmedabad)  
VILLAGE MOTI KHAVDI  
JAMNAGAR-360011, GUJARAT

OFFICE MEMO

Ref. No. GZRRC/2021

Date: 23.03.2021

**SUBJECT: - ZOO, RESCUE & REHABILITATION CENTRE HEALTH ADVISORY COMMITTEE**

Whereas the Central Zoo Authority, Ministry of Environment, Forests & Climate Change, Govt. of India has prescribed standard guidelines for ensuring scientific management of Zoological Parks in the country.

Whereas the Central Zoo Authority vide Rule 10 (31) of Recognition of Zoo Rules, 2009 and guidelines for Management Effectiveness Evaluation (MEF) of the Indian Zoos has advised all recognized zoos in the country to constitute Health Advisory Committee with a view to guide the zoo in its day-to-day animal health care issues.

Whereas keeping in view of above directive, the Zoo, Rescue & Rehabilitation Centre Advisory Committee including matters to Animal Health is being constituted with following as its members and below given Terms of Reference.

- |   |          |
|---|----------|
| 1. Dr. Brij Kishor Gupta,<br>Director<br>Greens Zoological Rescue & Rehabilitation Centre<br>Jamnagar, Gujarat<br>Mobile: 9316756712, Email: <a href="mailto:brij2.gupta@reliancefoundation.org">brij2.gupta@reliancefoundation.org</a>   | Chair    |
| 2. Dr. Abhishek Sharma<br>Director, Sakkarbaug Zoological Park<br>Junagadh, Gujarat, Email: <a href="mailto:directorsbz@rediffmail.com">directorsbz@rediffmail.com</a><br>Mobile: 9411163273,   | Member   |
| 3. Dr. Riyaz Kadivar<br>Zoo Veterinarian, Sakkarbaug Zoological Park<br>Rajkot Highway, Outside Majejadi Gate<br>Junagadh 362 001, Gujarat<br>Mobile: 6352586114, Email: <a href="mailto:vtssbz@rediffmail.com">vtssbz@rediffmail.com</a> | Member   |
| 3. Dr. Ajay Deshmukh<br>Facility In-charge- Satellite Rescue Centre, GZRRC<br>Mobile: 9404238633, Email: <a href="mailto:ajay.deshmukh@ril.com">ajay.deshmukh@ril.com</a>   | Member   |
| 4. Dr. Boon Allwin<br>Veterinary Officer, Khodiyar Animal Welfare Trust<br>Mobile: 9789511063<br>Email: <a href="mailto:boonallwin@gmail.com">boonallwin@gmail.com</a>  | Member   |
| 5. Dr. Navnath Nigot  | Convener |

Sr. Veterinary Doctor, GZRRC  
Mobile: 9689931247  
Email: [navnath.nighot@kw-trust.org](mailto:navnath.nighot@kw-trust.org)

#### TERMS OF REFERENCE

1. To ensure high quality and comprehensive animal health care of animals housed in Greens Zoological, Rescue & Rehabilitation Centre (GZRRC) and its satellite facilities at Jamnagar.
2. To draft and review all guidelines and policies including animal health as of to be adopted by the Greens Zoological, Rescue and Rehabilitation Centre Management.
3. To respond to emerging diseases issues by drafting protocols, guidelines and recommendations for the Greens Zoological, Rescue and Rehabilitation Centre for the scientific management of animals.
4. To provide review animal health related accreditation standards and strategic guideline on at matters related with sanitation, hygiene, prophylactics, nutrition, bio-security issues and management of the animals.
5. To recommend an annual health work plan to the Greens Zoological, Rescue and Rehabilitation Centre Society.
6. To report regularly to the Greens Zoological, Rescue and Rehabilitation Centre Society on the Committee's findings.
7. To perform any other functions as desired by the Greens Zoological, Rescue and Rehabilitation Centre Management in relation of upkeep and health management of captive wilds animals.
8. The term of this Committee shall be for a period of five years from the date of issue of this Office Memo.

The Health Advisory Committee shall hold not less than one meeting per annum, but may determine to meet more often if considered necessary by the Committee or upon the GZRRC or the Management.

  
Chief Executive Officer  
(GZRRC)

#### Copy for favour of information to:

1. Member Secretary, Central Zoo Authority, New Delhi
2. The Chief Wildlife Warden, Government of Gujarat, Gandhinagar, Gujarat
3. All members of the Committee.

## **Annexure IX- MoU with Charitable Trust**



**Memorandum of Understanding (MoU) between the Greens Zoological Rescue and Rehabilitation Centre (GZRRC) and Lt. Labhuben Ranchhoddas Barchha Charitable Trust (Trust).**

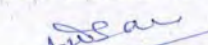
1. Whereas, this MoU is made in between the Greens Zoological Rescue and Rehabilitation Centre (hereinafter referred as **GZRRC**) being established by the Greens Zoological Rescue and Rehabilitation Centre Society (hereinafter referred as **GZRRCs**) at Village Moti Khandi, District Jamnagar, Gujarat and Lt. Labhuben Ranchhoddas Barchha Charitable Trust (Trust Reg. No. E/3059/Rajkot - hereinafter referred as **Trust**) to have formal linkages through a MoU on healthcare, preventive, health management, surgical interventions, clinical tests, disease diagnosis and consultation in treatment and management during the period of convalescence. Trust is operating a modern state of the art Veterinary General Hospital known as **ABOL TIRTH VETERINARY GENERAL HOSPITAL** (hereinafter referred as **ATVGH**), Revenue Survey No 458, Behind Ashok Nagar, Village : Dharampur, Taluka : Khambhalia, Dist.: Devbhoomi Dwarka.

2. Whereas, the GZRRC and ATVGH will work jointly to achieve the following objectives:

- a) To ensure high quality and comprehensive animal health care of animals housed in Greens Zoological, Rescue & Rehabilitation Centre (GZRRC) and its satellite facilities at Jamnagar.
- b) To draft and review all guidelines and policies including animal health as of to be adopted by the Greens Zoological, Rescue and Rehabilitation Centre Management.
- c) To respond to emerging diseases issues by drafting protocols, guidelines and recommendations for the Greens Zoological, Rescue and Rehabilitation Centre for the scientific management of animals.
- d) To provide review animal health related accreditation standards and strategic guideline on at matters related with sanitation, hygiene, prophylactics, nutrition, bio-security issues and management of the animals.
- e) To recommend an annual health work plan to the Greens Zoological, Rescue and Rehabilitation Centre.
- f) To report regularly to the Greens Zoological, Rescue and Rehabilitation Centre Society on the findings.
- g) To perform any other functions as desired by the Greens Zoological, Rescue and Rehabilitation Centre Management in relation of upkeep and health management of captive wilds animals.


Dr. Late Labhuben Ranchhoddas,  
Barchha Charitable Trust

  
Trustee

**Memorandum of Understanding (MoU) between the Greens Zoological Rescue and Rehabilitation Centre (GZRRC) and Lt. Labhuben Ranchhoddas Barchha Charitable Trust (Trust).**

3. Whereas, the ATVGH will provide the services of the Veterinarians working with their institution as and when required.
4. Whereas, the GZRRCs, will provide local transport and other logistic support to the staff of the ATVGH.
5. Whereas, the GZRRCs, will pay a suitable honorarium to as decided by the management to the Trust for their valuable services.
6. The term of this MoU shall be for a period of five (5) years from the date of signature.

**Termination:**

Either party may terminate this MoU. Either party may terminate the agreement upon a material breach by the other party. Either party to this agreement may terminate this agreement at any time by giving 30 days written notice incorporating the appropriate windup procedures that have discussed and agreed with other parties.

**Disputes:**

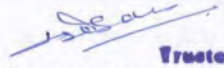
The agreement will be governed by the laws of the land and local authorities. Therefore any controversy or claim, dispute arising out of the signed MoU, or the application, breach, or validity and thereof, shall be submitted for the Arbitration. Such Arbitration proceedings shall be held at Jamnagar, Gujarat.

  
(Dr. Brij Kishor Gupta)  
Signed on behalf of GZRRC



Date: 31.05.2021

of, Late Labhuben Ranchhoddas,  
Barchha Charitable Trust

  
Trustee  
(Sh. Parag A Barchha, Trustee)  
Signed on behalf of Trust

Date: 31.05.2021

**Annexure X- CZA Approval for Establishment of Greens  
Zoological Rescue and Rehabilitation Centre**





GOVERNMENT OF INDIA  
भारत सरकार  
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
**Central Zoo Authority**  
केंद्रीय चिडियाघर प्राधिकरण

F. No. 20-1/2019-CZA(PKR)/258/2019

By Post  
Dated: 14.02.2019

To,  
The Sr. Vice President - Corporate Affairs,  
Reliance Industries Limited,  
"VRAJ", Near Suvidha Shopping Center,  
Paldi, Ahmedabad - 380 007 (Gujarat)

Sub:- Establishment of the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat by Reliance Industries Limited - reg.

Ref:-

1. Your letter No. NIL dated 07.01.2019.
2. The Chief Wildlife Warden, Gujarat letter No. WLP/T.26/B/9428-30/2018-19, dated 23.01.2019.
3. This office letter F. No. 20-1/2019-CZA(PKR)/227/2019, dated: 14.02.2019.

Sir,  
Reference is invited to the above cited correspondences.

The proposal for establishment of the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat by Reliance Industries Limited on an area of 250 Acres was scrutinized in the Central Zoo Authority (CZA).

The CZA conveys the approval under Section 38-H(1A) of the Wild Life (Protection) Act, 1972 to the establishment of the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat subject to fulfilment of the following conditions:-

- i. Observations of the Expert Group on Zoo Designing of the CZA communicated vide letter F. No. 20-1/2019-CZA(PKR)/227/2019, dated 14.02.2019.
- ii. The Reliance Industries Limited should submit an undertaking that the requisite number of experts of various disciplines including a competent Whole time in-charge, Animal Curator, Biologist, Veterinary Officer would be posted for execution of the said project.
- iii. The Reliance Industries Limited shall make provision on their own for necessary funds for creation of the proposed Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat as well as for future maintenance of the establishment on professional grounds.

Continued....

B-1 Wing, 6<sup>th</sup> Floor, Pt. Deendayal Antyodaya Bhawan, CZO Complex, Lodhi Road, New Delhi-110003

के-1 विंग, छठा तल, पंडित दीनदयाल अन्तोदय भवन, लोधी रोड, नई दिल्ली-110003

Tel: 011-24367846, 24367851, 24367852, Fax: 011-24367843

E-mail: cza@nic.in, Website: <http://www.cza.oic.in>

Brij2.Gupta

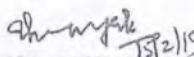
17

04.09.2019 17:12

- iv. Once the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat becomes ready for operation, it shall be made functional formally after getting prior recognition from the CZA under Section 38H(1), (3) and (4) of the Wild Life (Protection) Act, 1972.
- v. The ultimate responsibility of upkeep and welfare of animals at the Greens Zoological Rescue and Rehabilitation Kingdom at Jamnagar, Gujarat in accordance to the Guidelines and Rules notified by the Government of India in this behalf would lie on the Reliance Industries Limited.

This is for your information and necessary action.

Yours sincerely,

  
(Dr. Anup Kumar Nayak)  
Member Secretary

**Copy for information and necessary action to:-**

The Chief Wildlife Warden, Government of Gujarat, Aranya Bhawan, Block - A, 1<sup>st</sup> Floor, Opp. St. Xavier's School, Sector - 10, Gandhinagar - 382 010 (Gujarat), E-mail: [cwlwquj@gmail.com](mailto:cwlwquj@gmail.com)

**Annexure XI- Recognition of Greens Zoological Rescue and Rehabilitation Centre, by CZA**



**F.No. 20-1/2019-CZA(Part)**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**Central Zoo Authority**

To,

The Officer-in-Charge,  
Greens Zoological, Rescue and  
Rehabilitation Centre, Jamnagar,  
Gujarat  
(E-mail: bkgupta.brij@gmail.com)

B-1 Wing, 6<sup>th</sup> Floor,  
Pandit Deendayal Antyodaya Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi – 110 003,  
Telephone: +91-11-24367846/51/52,  
E-mail: cza@nic.in

Dated: 17<sup>th</sup> August, 2020

**Sub.: Recognition to the Greens Zoological, Rescue and Rehabilitation Centre, Jamnagar, Gujarat under Section 38H (1,3,4) of the Wild Life (Protection) Act, 1972 – reg.**

**Ref.: Your e-mail letter No.GZRRK/02/2020 dated 22<sup>nd</sup> July, 2020.**

Sir,

With reference to the correspondence cited above, I am directed to inform you that the evaluation of the Greens Zoological, Rescue and Rehabilitation Centre, Jamnagar, Gujarat was carried out by Dr. Devender Kumar, Evaluation and Monitoring Officer, Central Zoo Authority on 08.08.2020. With approval of the competent authority, recognition to the Greens Zoological, Rescue and Rehabilitation Centre (a satellite facility), Jamnagar and operationalization of the Rescue facility is granted for a period of three years. A copy of the evaluation report as submitted by the evaluation officer is enclosed with this letter for your perusal and needful action.

The recognition of the Greens Zoological, Rescue and Rehabilitation Centre ((a satellite facility), Jamnagar as per the provisions of the Section 38H (1,3,4) of the Wild Life (Protection) Act, 1972 is for a period upto 16<sup>th</sup> August, 2023 subject to compliance of the following directives under the Recognition of Zoo Rules (RZR), 2009 and mid-term evaluation.

The Greens Zoological, Rescue and Rehabilitation Centre (a satellite facility), Jamnagar should also submit time bound commitment for compliance within 30 days of communication of observations of the evaluation report and half yearly compliance report subsequently:

SI.	Norm No.	Particulars of suggestions/recommendation	Time Period to Comply
1.	9 (2.0)	The area provided for the night cell in night house at Satellite Rescue Centre, Greens Zoological Rescue & Rehabilitation Centre is larger than prescribed by the Central Zoo Authority (2.0m(l)x1.50m(b)x2.0m(h)). Keeping in view of the increasing human-animal conflict the facility may be utilized to house upto 60 numbers of	With Immediate Effect

		leopard.	
2.	10 (2.2)	The Zoo & Rescue Centre Operator should appoint an Education Officer before the zoo is opened to public.	Once the Zoo is opened, the Zoo Operator should depute the Education Officer.
3.	10 (3.1)	A master plan for the long-term development of the Zoo & Rescue Centre should be prepared and submitted to CZA for its approval.	One year
4.	10 (3.5)	The rescued animals to be housed at Rescue Centre should have prior approval from the CWLW, Gujarat.	With Immediate Effect
5.	10 (5.1h)	Provision of footbath of adequate size with proper disinfectant at entry and exit points of animal house should be provided.	With Immediate Effect
6.	10 (5.1i)	Indoor exhibits should have provision of ventilation in case the failure of air-cooling system.	With Immediate Effect
7.	10 (5.2)3	The Rescue Centre should have appropriate storage for meat, in case there is law and order problem in the city or pandemics like COVID-19.	With Immediate Effect
8.	10 (5.2)6	The Zoo/Rescue Centre Operator should take up the random food and water samples for testing periodically for microbiological, toxicological and any other contaminants at recognized laboratory	Six Months
9.	10 (5.3) 3	All animal arriving at the Rescue Centre should be screened for parasitic loads as per written schedule prepared by the veterinary officer and prophylactic medicines administered as per clinical requirements and vaccination of animals against infectious diseases are done, as per the schedule prescribed by the Veterinary Officer.	Six Months
10.	10 (5.3) 4	The Zoo/Rescue Centre should have written schedule of vaccination and de-worming of different species of the zoo animals and displayed at the enclosure site.	With Immediate Effect
11.	10 (5.3) 5	The Veterinary Officer/ Biologist at the Zoo/ Rescue Centre should maintain detailed records of observations of biological and social behaviour and health status of the animals including feed intake, medication and treatment provided in the keeper's diary, daily reports, animal history cards and treatment cards, as per standards specified by the Central Zoo Authority.	With Immediate Effect
12.	10(5.3)6	All staff involved with upkeep and healthcare of zoo animals shall be screened against zoonotic diseases once every year and those found positive to any communicable disease are provided appropriate treatment till they get cured and become free of the infection and during the period of such treatment, the	With Immediate Effect

		infected employees are kept away from the responsibility of upkeep and healthcare of the animals	
13.	10 (5.3)8 10 (6.4)	The Zoo/Rescue Centre should have formal linkages through an MoU on healthcare, preventive, health management, surgical interventions, clinical tests, disease diagnosis and consultation in treatment and management during the period of convalescence, with some Veterinary University/Institution.	One Year
14.	10 (6.2) 1	The Zoo/Rescue Centre should have appropriate animal restraint equipment, accessories and drugs.	With Immediate Effect
15.	10 (6.3)	The Zoo/Rescue Centre should appoint support staff (Lab Assistant & Compounder) as specified by the CZA.	Three Months
16.	10 (8.1)	The Zoo/Rescue Centre should not euthanize any animal unless doing so is essential for relieving from suffering from incurable disease /condition as per the norms of CZA.	With Immediate Effect

The recognition of the Greens Zoological, Rescue and Rehabilitation Centre, (a satellite facility) Jamnagar for period beyond 16.08.2023 would be considered on the basis of compliance of the conditions stated above and general performance of the zoo.

The recognition to the Greens Zoological, Rescue and Rehabilitation Centre (a satellite facility), Jamnagar may be revoked by the Central Zoo Authority, at any point of time, if the Zoo Operator is found not complying with the stipulated conditions.

Encl.: As above.

Yours faithfully,

  
(Dr Sonali Ghosh)  
DIG-CZA

**Copy for information and necessary action to:**

1. The Chief Wildlife Warden, Gujarat (cwlwguj@gmail.com).
2. Mr. Bhushan Oza, Reliance Industries Limited, Jamnagar, Gujarat (Bhushan.oza@ril.com).

Computer No. 138776  
Government of India  
Ministry of Environment, Forest and Climate Change  
Central Zoo Authority

B-1 Wing, 6<sup>th</sup> Floor,  
Pt. Deendayal Antyodaya Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi - 110 003  
Tel.: 011-24367846, 24367851, 24367852,  
Fax.: 011-24367849,  
E-mail: cza@nic.in, Website: <http://www.cza.nic.in>

Date: 19.04.2024

To,

The PCCF(WL) & CWLW,  
Government of Gujarat State,  
B/1, Aranya Bhavan, Near Ch-3 circle,  
Gandhinagar - 382 010,  
Gujarat  
(E-mail: [cwlguj@gmail.com](mailto:cwlguj@gmail.com)).

**Sub.:- Renewal of recognition to the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat for period beyond 16.08.2023 under Section 38H(1) of the Wildlife (Protection) Act, 1972 - reg.**

Ref.:-

1. Your application letter No. GZRRC/2023, dated 16.05.2023.
2. This office letter No. 20-1/2019-CZA(Part), dated 17.08.2020.

Sir,

With reference to above cited correspondences, it is to inform that evaluation of the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat was carried out by Mr. B. S. Bonal & Dr. A. B. Shrivastav on 27 & 28.01.2024. The evaluation report was submitted to Chairperson, Technical Committee, Central Zoo Authority for recommendation and consideration. The Chairperson, Technical Committee, CZA recommended to the CZA for renewal of recognition of the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat for a period of three years.

The Chairperson, Technical Committee, Central Zoo Authority approved the grant of renewal of recognition to the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat under Section 38H(1) of the Wildlife (Protection) Act, 1972 & to regularise the intervening period.

The renewal of recognition to the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat as per the provisions of Section 38H(1) of the Wild Life (Protection) Act, 1972 is for a period up to 18.04.2027 subject to the compliance of the following directives under the Recognition of Zoo Rules (RZR), 2009 and mid-term evaluation, and to regularise the period after 16.08.2023:

Sr.	Norm under RZR, 2009	No. RZR,	Particulars of suggestions/ recommendation	Time Period to Comply
<b>1. General requirements</b>				

1.	1.3	The GZRRC should take up with the Railway Authorities to construct underpass to cross Railway crossing saving time to reach each facilities.	Three months
<b>3. Development and Planning</b>			
2.	3.1	The GZRRC have submitted Master Layout Plan for the period of 2024-2034 to the CZA in January 22, 2024. GZRRC should pursue for obtaining expeditious approval.	Immediately
3.	3.3	GZRRC should assign appropriate nomenclature of zones (facilities) and display with appropriate signages at the entry of each zone.	Three months
4.	3.4/ 9.6	(a) Captive Breeding program can be initiated for animals like melanistic leopard (Black leopard), Snow leopard, melanistic Jaguar, White lion, Clouded leopard, Brown bear and other endangered species other than common leopards. As soon as the layout plan of GZRRC is approved, should plan for breeding of species. (b) The proposed plan for breeding other endangered animals submitted to the Central Zoo Authority to be pursued for its approval. (c) Before commencing the captive breeding program the heterozygosity of the animals should be ascertained.	Immediately
<b>4. Animal housing, display of animals and animal enclosures</b>			
5.	4.2	Enrichment in the paddock area and in night cell of the enclosure should consider species-appropriate vegetation types and other facilities.	Ongoing
6.	4.2	At Rescue Centre for Exotic herbivores (50 acres) the water trough made of plastic materials provided in the arena should be replaced with appropriate eco-friendly materials.	Three months
7.	4.3	The night cells at Cheetah Breeding Centre may be provided with CCTV for 24x7 monitoring.	Three months
8.	4.7(a)	If possible, in order to prevent any eventuality of animal injuries, the provisioning of a double layer of woven wire to create a partition between the White Cheeked Gibbon and Common langur enclosures should be considered. Or may consider housing compatible animals in the adjacent enclosures.	One year
<b>5. Upkeep and healthcare of animals</b>			
9.	5.1	At the Rescue Facility for large cats the paddock should have appropriately sized openings to facilitate sample collection during Positive Reinforcement Training.	Three months

10.	5.2.9.1(a)	The team observed that the diet being given to the animals are different then the diet chart prepared by the dietician particularly for carnivores. On being asking about change it was appraised that the animal diets are designed as per the body condition, health of animals and appropriate diet with provision for daily changes in diet based on individual requirement. It is advised that any change in the diet maybe noted by the veterinarian in consultation with the nutritionist.	With immediate effect.
11.	5.3.4	Prophylactic Schedule viz Deworming, Vaccination, Health checkup etc. should be displayed in Veterinary Office too and keepers gallery with appropriate size.	With immediate effect.
12.	5.3.5	To reduce paper wastage, data reported in various data sheets can be comprised and concise in one data sheet, particularly Keepers Diary and Daily Report may be merged.	Six months
<b>7. Post-mortem and disposal of carcasses of animals</b>			
13.	7.5/ 7.1	As informed during the visit, the Postmortem room and incinerator will be shifted to a new site. The design of the proposed Post Mortem house may be as per guideline framed by the CZA and in consultation with a wildlife pathologist.	One year
<b>10. Research activities</b>			
14.	10.1	There is lot of scope on research work e.g. How the change in diet timing is impacting (positively) the behaviour or husbandry of the animals housed carnivores in particular, the research work should be taken up accordingly.	Three months
15.	10.1	The GZRRC may utilize the opportunity to collect morphometric and genetic data for black Jaguar, black leopard and other species as and when possible, for research studies.	Ongoing
16.	10.5(6)	The matter in connection with the procurement of long-range PI tag readers, for which GZRRC requested the name and contact details of the vendors from the CZA. The same may be pursued with the CZA.	Three months
<b>11. Education and outreach activities</b>			
17.	11.1	The GZRRC displayed a beautiful Video for the Leopard Rescue Centre. It is advised that the GZRRC should have some footage depicting all process and nature of area from the conceptualization of the facility.	Six months

#### Other Recommendations

Sl.	Recommendations
1.	If possible, to ensure the quality of food GZRRC should have a facility like abattoir exclusively for consumption of animals of GZRRC. The GZRRC may consider creating the same near the facility (not within the GZRRC facility).

2.	GZRRC may reconsider for the purchase of Scanning Electron Microscope for the Central Laboratory.
3.	In all future construction, the GZRRC management may consider providing raised flooring in the night cell of large carnivores.
4.	While taking up new construction of animal exhibits at the Zoo, the GZRRC should consider developing proper viewing point and, standoff barrier, as per the guidelines of CZA.
5.	The GZRRC may consider developing mixed species enclosures, depending on the compatibility of the species housed.
6.	The GZRRC may utilize fixing of solar panel on roof of Admin Block and Animal Night houses for reducing carbon footprint.
7.	The Central Laboratory at GZRRC may consider establishing a semen bank for conservation of endangered species.
8.	GZRRC may re-consider number of enclosures proposed in the lay out plan of proposed upcoming zoo
9.	GZRRC having an excellent advanced veterinary infrastructure, subject matter experts and research facilities, and an animal collection comprising of several endangered animals and their housing facilities. The team recommends that the GZRRC should consider to establish an "Institute of Zoo Sciences and Wild Animal Health".

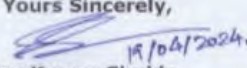
A time bound compliance report regarding progress made in implementation of the aforesaid conditions should be submitted to the Central Zoo Authority within 30 days of the date of issue of this letter and half yearly compliance report should also be submitted subsequently.

The renewal of recognition to the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat for period beyond 18.04.2027 would be considered on the basis of compliance of the conditions stated above and general performance of the zoo & ratification by the Technical Committee, CZA and subsequently by the Central Zoo Authority.

The recognition to the Greens Zoological Rescue and Rehabilitation Centre Jamnagar, Gujarat shall be revoked by the Central Zoo Authority, at any point of time, if the Zoo Operator is found not complying with the stipulated conditions.

This is for information and necessary action please.

Yours Sincerely,

  
15/04/2024.  
Dr. Sanjay Kumar Shukla  
(Member Secretary)

**Copy for information and necessary action to -**

1. The Director, Greens Zoological Rescue and Rehabilitation Centre, SSO, Annexe-5, At & Post - R Greens, Village - Moti Khavdi, Jamnagar - 361 142, Gujarat (E-mail: gzrrc@outlook.com) - for information and with a request that the conditions stipulated may got implemented.
2. The DPA, CZA - to update database.



## **Annexure XII - Approval of Master Plan**

**Computer No. 151604**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**Central Zoo Authority**

B-1 Wing, 6<sup>th</sup> Floor,  
Pt. Deendayal Antyodaya Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi – 110 003  
Tel.: 011-24367846, 24367851, 24367852,  
Fax.: 011-24367849,  
E-mail: cza@nic.in, Website: <http://www.cza.nic.in>  
**06-06-2024**

To,

The Director,  
Greens Zoological Rescue and Rehabilitation Centre,  
SSO, Annexe-5, At & Post – R Greens, Village – Moti Khavdi,  
Jamnagar – 361 142,  
Gujarat(E-mail: gzrrc@outlook.com).

**Sub.- Approval of Master Plan of the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat – reg.**

**Ref.: -**

**(i) Your e-mail correspondence dated March 1, 2024.**

**(ii) Your letter No. GZRRC/2024/SG/11 dated 22.01.2024.**

Sir,

With reference to the above cited correspondence, it is to inform that revised Master Plan of the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat was placed before the 110<sup>th</sup> meeting of the Expert Group on Zoo Designing of the Central Zoo Authority held on 06.03.2024.

The proposal was deliberated with the observations attached as **Annexure-1**. The Expert Group recommended to the Technical Committee, CZA for the approval of the said Master Plan subject to compliance with the above observations.

Subsequently, the proposal was deliberated in 110<sup>th</sup> Meeting of the Technical Committee, CZA held on 14.05.2024, wherein, the Committee recommended to the Central Zoo Authority for the approval of the revised Master Plan of the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat subject to time-bound compliance to the observations attached as **Annexure – 1**.

Accordingly, this office conveys the approval of the Competent Authority for the Master Plan of the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat subject to time-bound compliance to the observations attached as **Annexure – 1**.

In view of the above, it is requested to submit compliance of observations on the Master Plan within two months from the date of issue of this letter for verification and authentication.

This is for your information and necessary action.

**Yours sincerely,**

**Encl.:** As above.

**SANJAY KUMAR SHUKLA**  
**MEMBER SECRETARY**

**Copy for information and necessary action to:-**

1. The PCCF(WL) & CWLW, Government of Gujarat State, B/1, Aranya Bhavan, Near Ch-3 circle, Gandhinagar – 382 010, Gujarat (E-mail: cwlwguj@gmail.com).

## **Annexure – 1**

### **Observations of the 110<sup>th</sup> meeting of the Expert Group on Zoo Designing of the Central Zoo Authority held on 06.03.2024 on revised Master Plan of the Greens Zoological Rescue and Rehabilitation Centre, Jamnagar, Gujarat**

1. Under heading "Carrying Capacity of Facilities at Greens Zoological Rescue and Rehabilitation Centre as on 20.01.2024" only 4m<sup>2</sup> area was proposed for housing small snakes and 8 enclosures were proposed with a carrying capacity of 200 snakes which results into 0.16 m<sup>2</sup> area per animal, the area needs to be increased as per prescribed norms/ guidelines. Similarly, the proposed carrying capacity for other animals should also be revisited in terms of available area per animal.
2. Under Part III, Chapter 11 'Management Plan' was written in brief. The same should be elaborated by detailing out the activities to be taken up in the line indicated in the Master Plan of the zoo for a particular time frame year wise (1 year to five years) in tabular form, prioritizing of the works to be taken up in phases and financial year wise (as per work plan) and provide realistic estimates of the proposed works indicating the sources of funding. This should also contain revenue to be collected and funding expected to be received from the government and other sources. The management plan should also contain the procedure to be adopted and person responsible for carrying out different items of works with their financial and administrative powers.
3. Do not indicate Central Zoo Authority (CZA) for funds for implementing the work plan. The CZA provides fund on case-to-case basis and availability of fund to zoos.