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MANAGEMENT PLAN – MADEI WILDLIFE SANCTUARY

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CHAPTER 1

INTRODUCTION TO THE MADEI WILDLIFE SANCTURARY

1.1 NAME, LOCATION, CONSTITUTION AND EXTENT OF AREA**1.1.1 NAME**

The name of the Protected Area (PA) is Madei Wildlife Sanctuary. It is named after the river Madei which flows across the Sanctuary.

1.1.2 LOCATION

Madei Wildlife Sanctuary is situated in Western Ghats in Sattari Taluka, North District of Goa State. The map showing location of the Sanctuary as **Annexure III** and forest cover is provided in **Annexure V** respectively.

1.1.3 CONSTITUTION AND EXTENT

The Sanctuary is spread over an area of 208.48 sq. km. The Government of Goa notified the Madei Wildlife Sanctuary vide Notification No. 2-333-99-FD/A-Part/940 dated 31st May 1999 and No. 2-333-99-FD/A-Part/940 and 2-333-99-FD/A-Part/941, dated 31st May 1999 **Annexure I**. Before notifying it as sanctuary in 2011, the notified forest area was scientifically managed as a part of North Goa Forest Division **Annexure II**. The sanctuary is divided into 16 beats with the three Round in [Codal](#), [Charavane](#) and [Caranzol](#) (details of Rounds and Beats is provided in **Annexure IV B** and map showing the location of beats is provided in **Annexure IV A**. This sanctuary falls within the jurisdiction of Deputy Conservator of Forest (Wildlife and Eco-tourism, North) and consists of one wildlife range and the headquarter is situated at Maloli.

1.2 Approach and Access

The headquarters of Madei Wildlife Sanctuary is located in Maloli village, which is 42.5 kms from the nearest railhead at Thivim. The distance from MOPA and Dabolim airport is approximately 68 kms and 69 kms respectively. The distance from Margao railway station is 85 kms and the range is located at a distance of 55 km from Forest Department Headquarters at Altinho, Panaji. The Madei Wildlife Sanctuary headquarters is approachable by road from Valpoi city which is located at 12 Kms. Different villages that are situated on the periphery of the sanctuary have motorable Panchayat roads as well as forest roads access leading to the Sanctuary. From Panaji one can reach Madei Wildlife Sanctuary via NH748 or MDR22 and SH1 routes as shown in Figure 1.

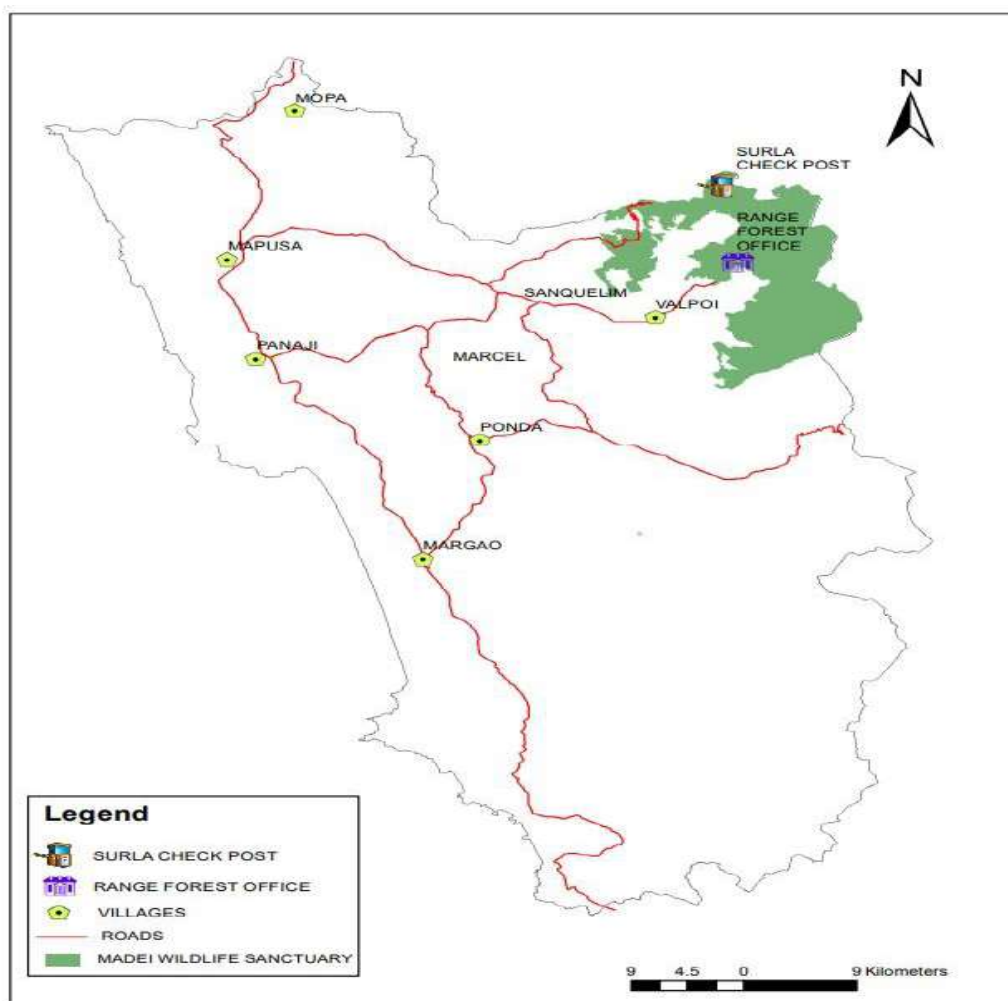


Figure 1: The route map to Madei Wildlife Sanctuary

Though October to May is ideal time to visit the Sanctuary, winter is pleasant time to get best experience in the sanctuary (October to February). The monsoon, from June till September, is also a good time of the year to visit some of the areas, especially waterfalls. There are 19 seasonal waterfalls originating and falling from the heights of the Sahyadri. One can visit some of the perennial waterfalls such as Satrem waterfall, Ladkyacho Vajar, Vajra Sakal etc. throughout the year.

1.3 Statement of significance

- (1) The sanctuary harbors rich biodiversity with high endemism of flora and fauna. Owing to its contiguity with other protected areas of Karnataka in its north-eastern part and Bhagwan Mahaveer Wildlife Sanctuary and National Park in the southern part, the Sanctuary offers natural corridors for the seasonal migration of long ranging animals within the greater conservation unit.
- (2) Madei Wildlife Sanctuary is renowned for its many waterfalls, including VazraSakla (Surla) waterfalls in the Chorla Ghats. The rock faces and cliffs that envelop the Vazra falls were once home and nesting grounds of critically endangered long-billed vultures.
- (3) The Sanctuary is an International Bird Area (IN177) which complies with the IBA criterion: A1. Globally threatened species, A2. Restricted-range species and A3. Biome-restricted species. Some of the important bird Species reported are Nilgiri Wood-pigeon, Malabar Parakeet, Malabar Grey Hornbill, Grey-headed Bulbul, Malabar Trogon, Rufous babbler and Dwarf Kingfisher. A total of 254 bird species have been recorded in the Sanctuary.

- (4) The Sanctuary area is bestowed with many sacred grooves where deities are also worshiped over centuries. These are Devachi Rai at Satrem, Devacho Hudo at Derodem, Holyechi Rai at Caranzol, Maulichi Rai at Vagheri, Devachi Rai at Zarani, Poshyachi Rai at Codal, Bheryachi Rai at Rivem, Devachi Rai at Surla, Mharinganachi Rai at Ivrem, Nirankalachi Rai at Maloli, Ajobachi Tali at Bramhakarmali etc. These sacred grooves are the treasure house of biodiversity and the genetic material. These sacred grooves contain rare and precious species, virgin trees, climbers, ground flora, reptiles, birds, insects and butterflies. The Sanctuary also supports unique freshwater swamps commonly referred to as Myristica Swamps which has sizeable number of Myristica species of trees also called as freshwater mangroves due to their knee shaped roots.
- (5) The Madei River, down stream known as the Mandovi River, is the lifeline of the State of Goa. It originates in Karnataka and passes through the Madei Wildlife Sanctuary and drains into the Arabian Sea at Panaji in Goa. The entire sanctuary constitutes the watershed of the Mandovi River.
- (6) The Sanctuary harbour diverse floristic and faunal components of Western Ghats. Over a thousand species of flowering plants and rare endemic orchids (arboreal and terrestrial) are found in the sanctuary. Indian Gaur, the biggest mammal and the state animal of Goa, can be spotted here along with Sloth bears, Mongooses, Wild dogs, Slender loris, Deers. All the large four most venomous snakes in the country, find protection in the Madei Wildlife Sanctuary. Malabar Gliding Frog, Beddome's Leaping Frog, Endangered Marbled Ramanella, Maharashtra Bush Frog, Madei Caecilian, Goa Caecilian, Nadkarni's Caecilian are some of the amphibians observed here. About 254 species of butterflies are present here including Southern Bird Wing the largest butterfly of Indian Sub-Continent, Paris Peacock, Malabar Tree Nymph (**State Butterfly**), Map Butterfly etc.

- (7) Easy access to the sanctuary offers tremendous scope for spreading the message of conservation through nature education and well-developed eco- tourism packages from this area.
- (8) Forests of Madei are abode of cultural and traditional needs of primitive Dhangar communities. The Dhangar community in this area is dependent on forests and forestry works. There is high density of human and livestock population in and around the forest areas of the Sanctuary, it is a threat to the Sanctuary as it causes biotic interference however, and to minimize the impact an eco-development initiative is the only remedy.
- (9) The Madei Wildlife Sanctuary is well protected and scientifically managed for in- situ conservation of rich flora and fauna.

CHAPTER-2

BACKGROUND INFORMATION AND PROTECTED AREA ATTRIBUTES

2.1 BOUNDARIES

**Description & evaluation of Madei Wildlife Sanctuary of Goa, India:
Existing situation.**

Introduction to the Area

Name, Location, Constitution, and the Extent of Area.

The Madei Wildlife Sanctuary (WLS) is in Sattari taluka of North Goa District, Goa.

Name	Madei Wildlife Sanctuary, Goa.
Boundaries	1. Notification No.2-333-99-FD/A-Part/940, 1999 (Area: 44.27 sq. kms.) Boundaries:~ Eastern boundary State boundary of Goa; Northern boundary State boundary of Goa; Southern boundary - Northern boundary of Bhagwan Mahavir Wildlife Sanctuary and southern border of Assodem; Western boundary - The western boundaries of Assodem and Dongurli. 2. Notification No 2-333-99-FD/A-Part/941, 1999 (Area: 164.21 sq. kms.)

	Boundaries- Eastern Boundary Runs along the eastern boundary of villages Satrem and Derodem along the Goa-Karnataka border and 'then along the' northern boundary of Vainginim and western boundary of Zarani and then along the south-western boundary of Codval up to the Goa Karnataka border then going along and meeting the northern border of Bhagwan Mahavir Wildlife Sanctuary. Northern boundary - Runs along the northern boundary of village Satrem along the Goa-Karnataka border then along the western and southern boundary of Surla and then along the eastern boundary of Golauli to touch the Goa-Karnataka border and then runs along the State boundary of Goa up to Kelaudem. Southern boundary - The northern boundary of Bhagwan Mahavir Wildlife Sanctuary and the southern boundary of Govane. Western boundary - Runs along the western boundaries of the following villages in the south to north direction - Gavane, Sirsode, Siranguli, Caranzol, then along the banks of the Mahadayi river upto the western boundary of Carambolim Brama, Xelopo Buzzuroco, Sigonem, Codal, and then going along the southern boundaries of villages Golauli, Ivre curdo, Ivre buzurroco, Choraundem and then going along the eastern boundary of Pale, Compordem and then goes along the western boundary of Compordem, southern
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CHAPTER 2 – BACKGROUND INFORMATION AND PROTECTED AREA ATTRIBUTES

	and eastern boundary of Zorme and then eastern, southern and western boundary of Dabem along the Western boundary of Zorme and western and northern boundary of Gullulem. Then joining the western boundary of Charaundem and going along the southern boundary of Kelaudem upto the State border of Goa.
Constitution	This PA was established in 1999 to protect adequate ecological, faunal, floral, geomorphological. Natural or zoological significance for the purpose of protecting, propagating, or developing wildlife or its environment (hereinafter called the "said area").

2.1.1 INTERNAL

The entire Madei Wildlife Sanctuary is one wildlife range and divided into three rounds and sixteen beats. The existing human habitation and pending issues of the settlement of the rights is a major concern towards physical demarcation of the external as well as internal boundaries.

2.2 Geology, Rock and Soil

2.2.1 GEOLOGY

Rock formation is traced back to the Pre-Cambrian age. Main rocks are of volcanic, folded, metamorphosed, and sedimentary types. A narrow band of Deccan trap Basalts is found at the higher elevation.

2.2.2 ROCK

Main rock types available in the Madei Wildlife Sanctuary are shown in the Figure 2 and are as follows:

i) **Quartzite and Quartzite-Sericite Schist:**

These rocks are formed as a result of metamorphosis of sand stones and volcanic rocks. Weathering process of these rocks results in sandy soil over a superficial layer of laterite.

ii) **Quartz-Chlorite Schist, Quartz Actinolite Chlorite Schist and Meta Basalt:**

These are grey green metamorphic rocks, hard crystalline mostly occur as schistose to bulky form. They consist of ferro-magnesium minerals viz, chlorite and actinolite along with quartz and feldspar. Soils derived from these rocks are clayey laterite reddish brown in appearance overlain with a small layer of laterite. These rocks occur towards north-west of Caranzal in the sanctuary area.

iii) **Meta gray wackes:**

These are metamorphic rocks, hard, crystalline, contain crude form of sand stones, quartz, feldspar, clay, chlorite, mica and rock particles. On weathering they produce reddish brown ferruginous clay and laterite of thin layer. Towards north-eastern side of Madei Wildlife sanctuary around Surla and Satrem villages bordering Maharashtra and Karnataka below the Deccan trap outcrops of these rocks occur in exposed form over the hill slopes.

iv) **Pink Phyllite:**

These are soft, medium to fine grained partly schistose consisting of quartz, sericite, mica, limonite and ferruginous clay with bright to light pink in appearance. These rocks are found in Maloli, Codal, and Sanvordem and around Brahma Karmali villages of Madei Wildlife Sanctuary.

v) **Crystalline Limestones:**

These occur exposed in the form of thin band over hill slopes towards north- eastern part of Madei Wildlife Sanctuary. The colour of the rock being dull grey with higher percentage of magnesia along with siliceous matter intercalated with thin chert bands. At few locations these rocks are inter bedded with pink phyllite. Lime stone rocks stretch from Vainguinim, Derodem, Satrem, Surla, Golauli and IvremCurdo over a stretch of 20 km in Madei Wildlife Sanctuary.

vi) **Granite Gneiss:**

Primarily these rocks contain quartz, feldspar, mica and horn blonde occurring as exposed gneissic and banded structure derived from metamorphosis of granite. Generally, these rocks are whitish grey, hard and on weathering produce clayey loam type of soil. Laterite cover is absent over these exposed rocks. The outcrops extend over a long distance towards eastern hill ranges of the Sanctuary over a stretch of about 30km from Derodem to Collem of Sanguem Taluka with a width of 5- 8 km.

vii) **Deccan Trap Basalts:**

Basically, these are volcanic rocks, resulted from horizontally bedded lavas having fine grains dark grey in colour. These occur over steep slopes in exposed form in several parts of the sanctuary. On weathering they derive reddish brown clayey soil with a superficial layer of laterite.

viii) **Laterite:**

These rocks occur over Pre-Cambrian formations in varying thickness. In Madei Wildlife Sanctuary laterites are found at the foothills and plateaus. These rocks are reddish brown hydrated iron oxide (Limonite) as well as whitish hydrated Aluminum (Bauxite) according to the intensity of leaching effect. In the substrata friable gravelly laterite and orange buff laterite clay is found at the bottom.

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ix) Alluvium:

Along the river banks of Madei Wildlife Sanctuary, sand, silt and clay deposits are conspicuous in the process of surface runoff during monsoon. In the river beds and along banks pebbles and boulders of varying sizes are seen studded forming hard carpet.

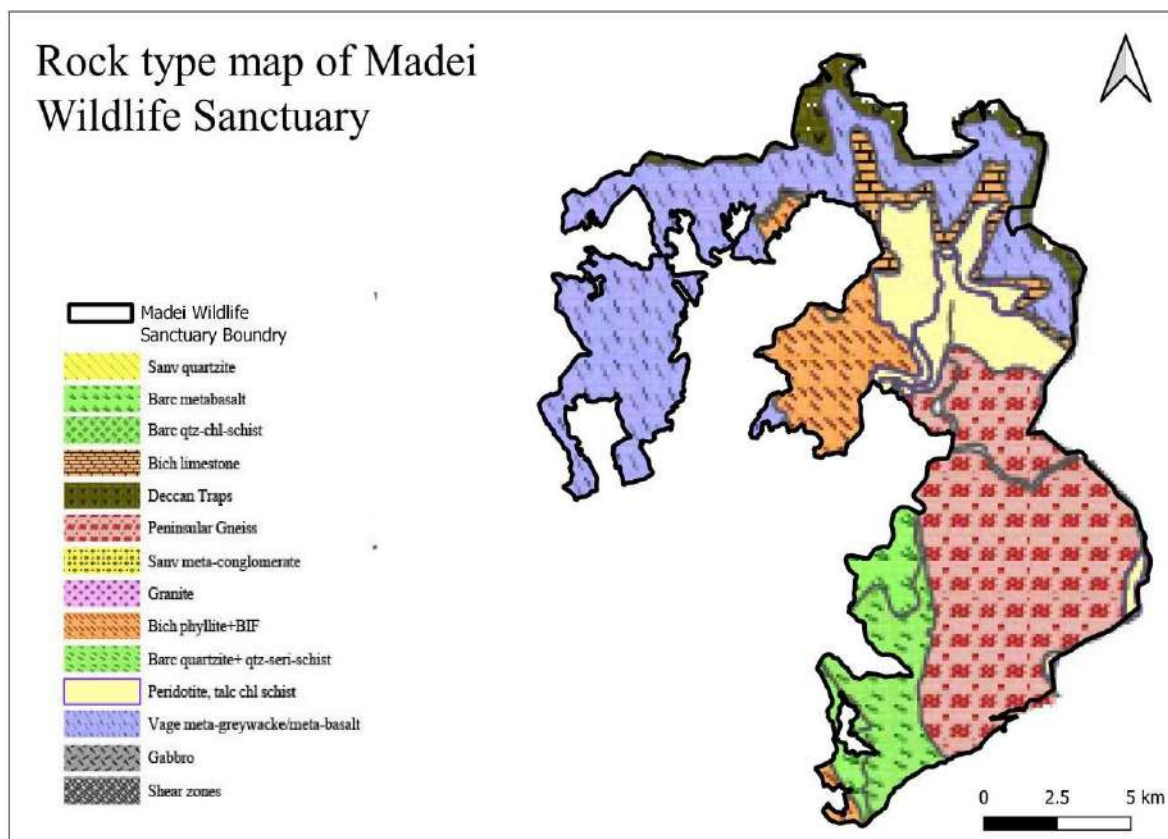


Figure 2: Map showing the rock types of Madei Wildlife Sanctuary

2.2.3 SOIL

Owing to prolonged weathering process of parent rocks, soil formation takes place. Soil depth invariably depends upon aspects, elevation, and gradient, standing tree/shrub vegetation, climatic condition, duration of exposure of the terrain and land use over the years. Soils of Madei Wildlife Sanctuary are classified under Netorlium series having dark reddish brown to dark brown lateritic soils derived from pink phyllite. These soils are deep, well drained, silty

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loam to silty clayey loam with depth ranging from 0.10 m to 0.50 m and rich in organic matter. Soil pH varies from 4.5 to 7.00 and is acidic in nature. Soils in the sanctuary area are fertile supporting moderate to luxuriant tree vegetation.

The map showing the soil organic carbon (tonnes carbon/hectare), clay content (gram/kg) and total nitrogen content (cg/kg) is given in figure 3, 4 and 5 respectively.

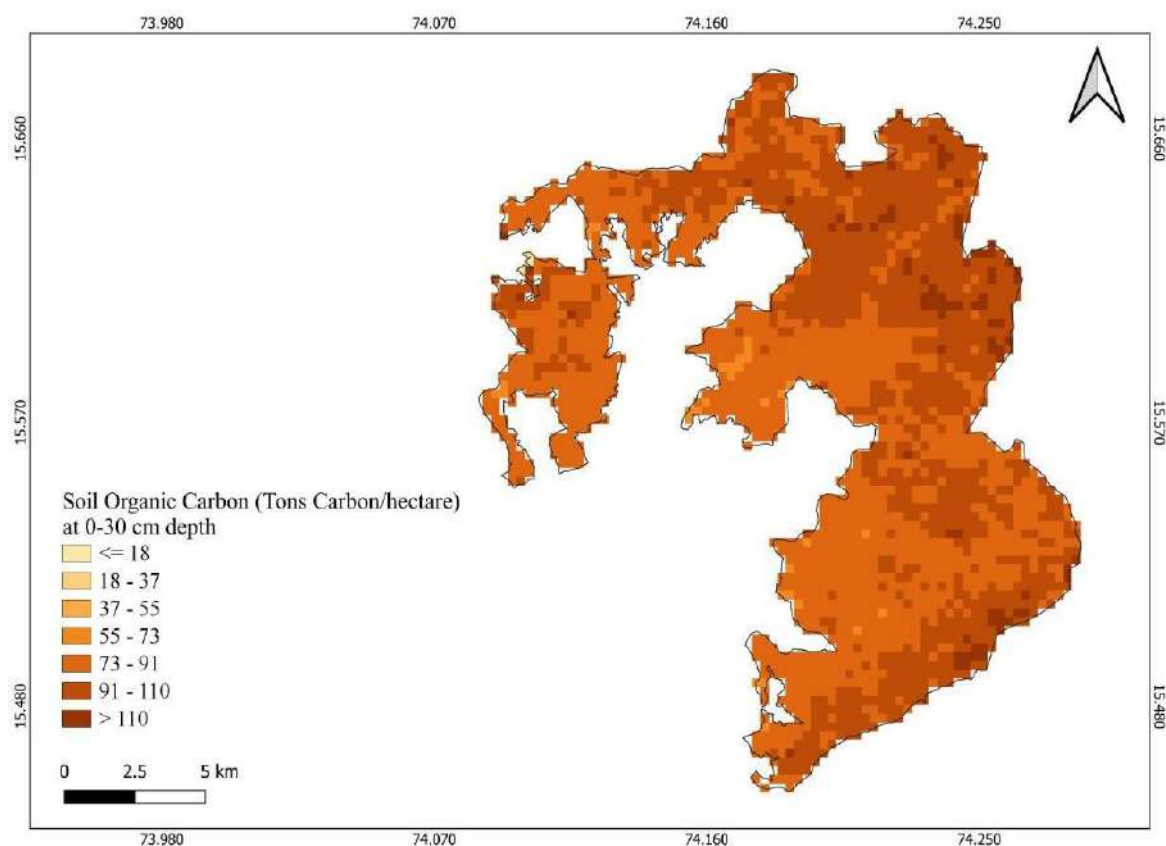


Figure 3. Map showing the soil organic carbon (tones carbon/hectare)

CHAPTER 2 – BACKGROUND INFORMATION AND PROTECTED AREA ATTRIBUTES

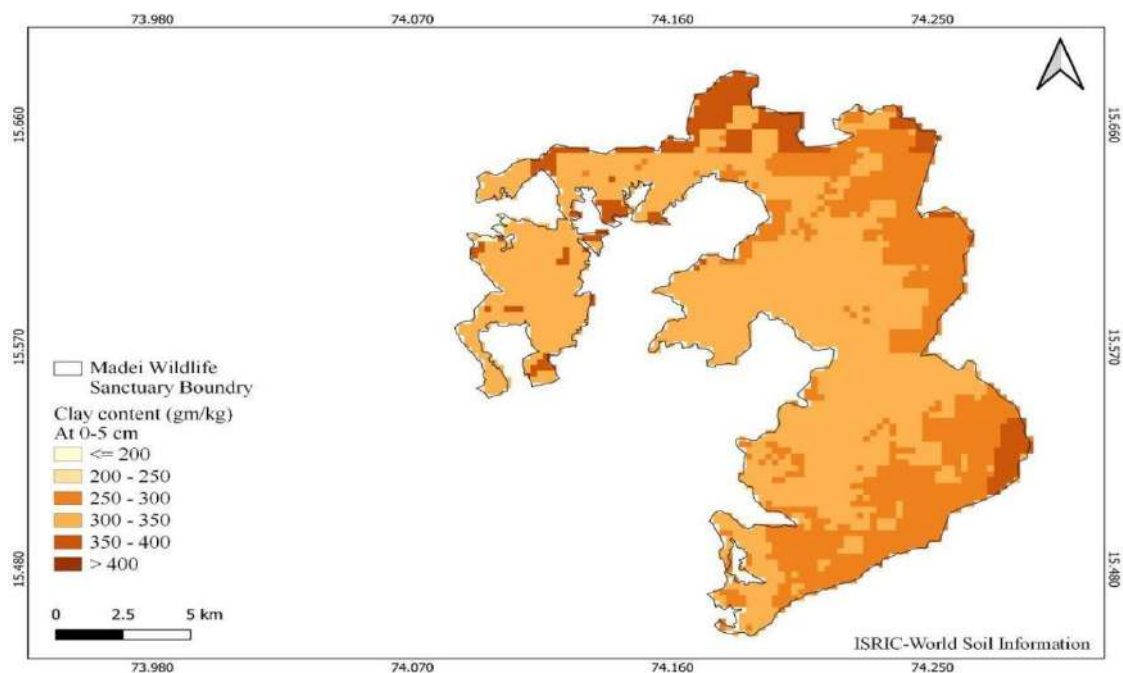


Figure 4: Map showing the Clay content in Madei Wildlife Sanctuary

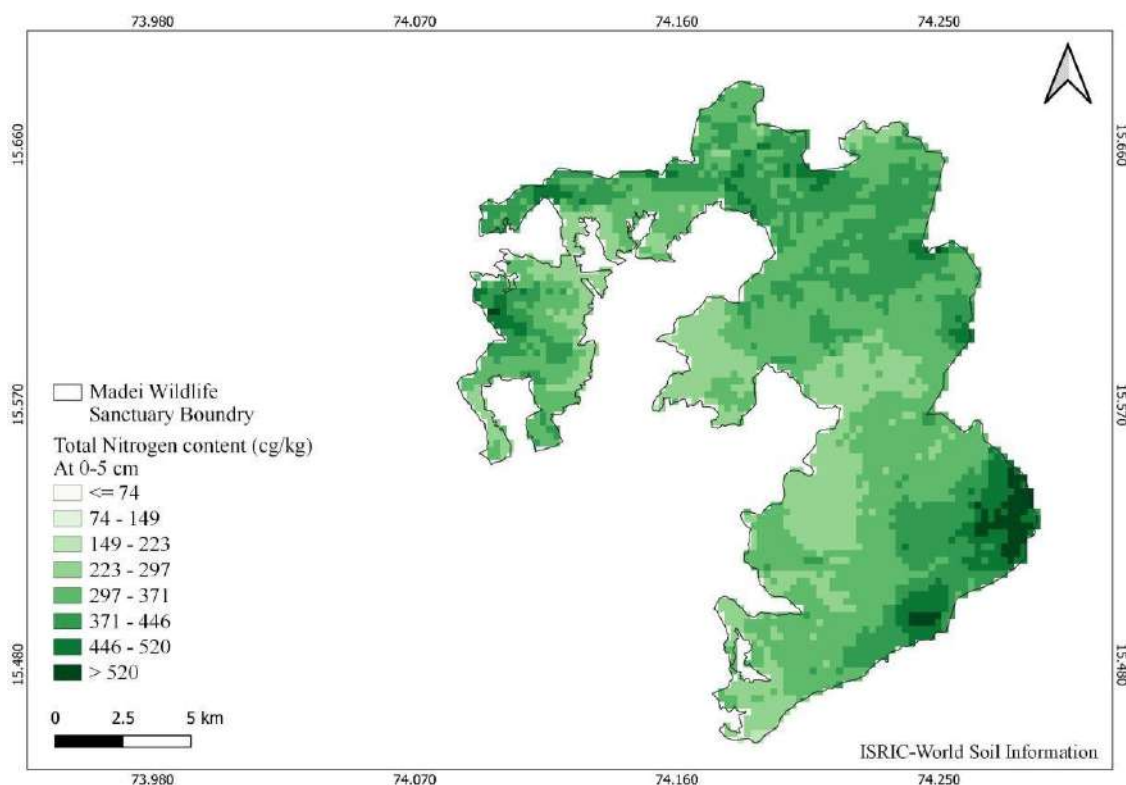


Figure 5: Map showing total nitrogen content in the soil of Madei Wildlife Sanctuary

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2.3 TERRAIN

The terrain is hilly towards north and north-east in a semi-circular shape. There are several hillocks and spurs in the sanctuary and at the foothills deep valleys and gorges exist. The Sanctuary has three highest hill peaks of the State viz, Sonsogad with an elevation of 1025 m, Katlanchimauli with an elevation of 812 m near Satrem village and Vagheri is 725 m high. Madei Wildlife Sanctuary is contiguous with Bhagwan Mahavir Wildlife Sanctuary, Netravali Wildlife Sanctuary and Cotigaon Wildlife Sanctuary. Further in the east sanctuary is contiguous to Bhimgad Wildlife Sanctuary of Karnataka. The sanctuary has unique rock formations on eastern side which have been described as Rocky knobs.

Map showing the elevation profile of Madei Wildlife Sanctuary is given in figure 6

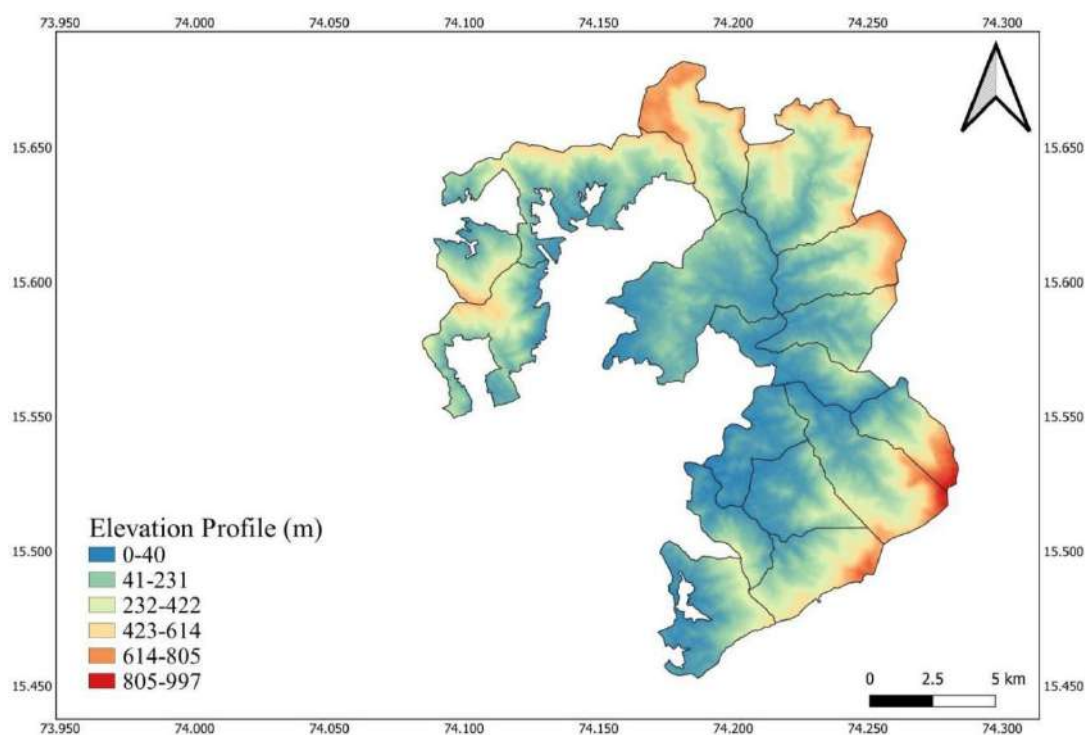


Figure 6: Map showing the elevation profile of Madei Wildlife Sanctuary

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2.4 CLIMATE

Typical tropical climate prevails in Madei Wildlife Sanctuary being a part of Western Ghats. Three distinct seasons are usually experienced. Monsoon commences from early June and extends up to October, whereas winter is mild and pleasant, beginning from latter part of November and stretching up to late January. Summer starts from February and peaks in May. Occasional showers are received in November and December with cyclonic effects of north-east monsoon caused by depression in Bay of Bengal.

2.4.1 RAINFALL PATTERN AND DISTRIBUTION

The Sanctuary receives rain from the south-west monsoon, thereby experiencing a dry period lasting from November to May [November to February (winter) and March to May (summer)]. Pre-monsoon showers are experienced in late April and May accompanied with lightning and thunder. Retreating monsoon also brings thunder and showers in November and December. Average annual precipitation is 3750 mm. Of late, monsoon is quite erratic. The map showing the precipitation in Madei wildlife Sanctuary is given in Figure 7& 8.

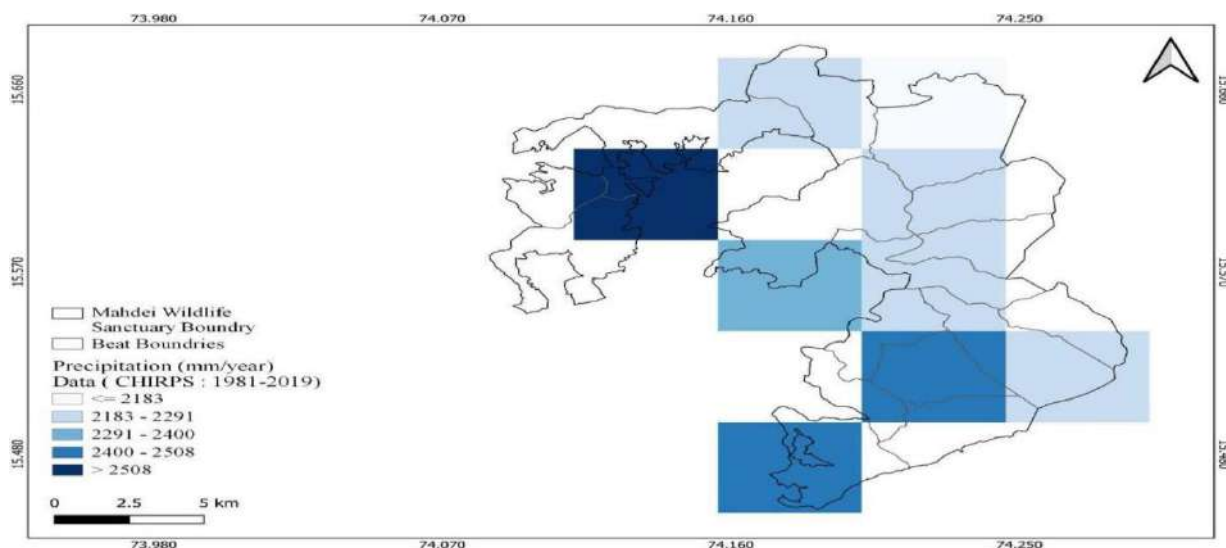


Figure 7: The map showing the precipitation in Madei Wildlife Sanctuary

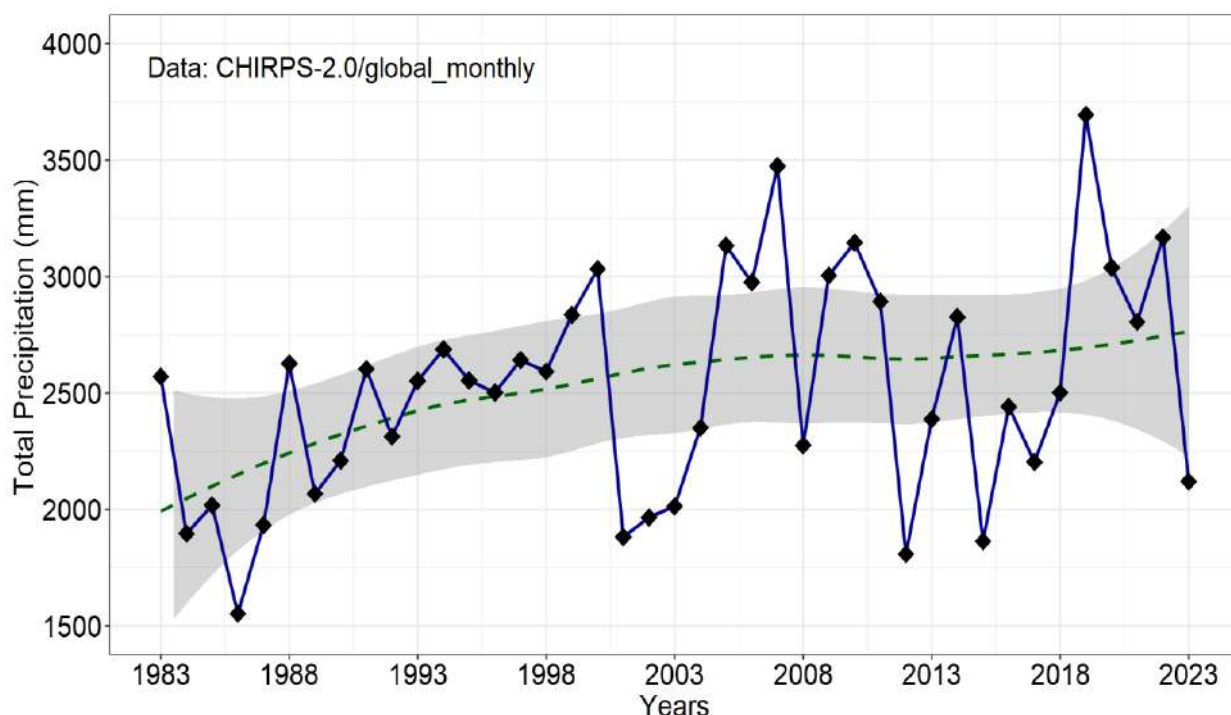


Figure 8: The map showing the Annual Average precipitation in Madei Wildlife Sanctuary.

2.4.2 TEMPERATURE – A SUMMARY OF YEAR-ROUND PATTERN

There is slight variation in temperature throughout the seasons. May is the relatively warmest month and the mean daily temperature is around 30°C and maximum temperature rises to 36°C. January is the coolest with mean daily temperature of about 25°C. Temperature varies from 21°C to 35°C. Frost is absent in the area but post monsoon dew fall is observed which invariably helps all agricultural crops and forest vegetation. The annual average temperature pattern over ten years is shown in figure 9.

CHAPTER 2 – BACKGROUND INFORMATION AND PROTECTED AREA ATTRIBUTES

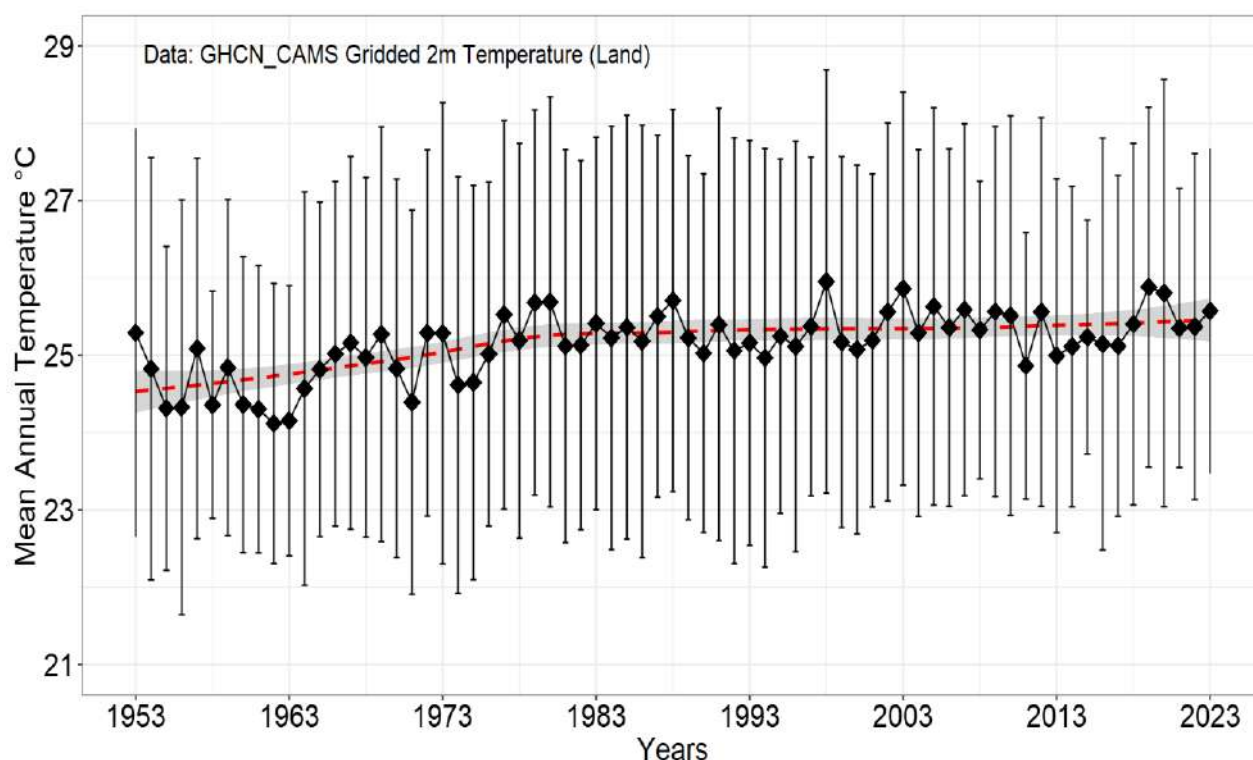


Figure 9: Graph showing the annual average temperature pattern over 70 years in Madei Wildlife Sanctuary

2.4.3 WIND SPEEDS

During south-west monsoon season, wind blows from south-western direction to north-eastern direction and it blows north-western or eastern during post-monsoon.

2.4.4 DROUGHT

The Sanctuary is not a drought prone area.

2.5 HYDROLOGY & WATER SOURCES

Madei River originates from mountains of Bhimgad wildlife Sanctuary in Karnataka and has nine tributaries; of which four tributaries pass through the Madei Wildlife Sanctuary. From the Degao locality it forms Mudrichi nallah which drops from 30m high forming a waterfall over the steep cliff at Surla and flows down to form Surla nadi. Another water course on the up-stream side viz Deuchi nadi joins Surla nadi north of Codal at about 2.5km distance. Surla nadi later known as Nanode nadi and thereafter, near Ustem, the tributary is named as Madei. In the beginning, water course passes through the villages of Satrem and Naneli and is named after them. One stream comes from Codal side and joins Madei. Main stream of Madei passes through the villages of Sonal, Sanvordem, Velguem and Massordem in Sattari. Near Ustem, Madei changes its course flowing in east-west direction and at Massordem, Madei meets another tributary Veluz with its source at Ivrem Buzruco village in the Sanctuary. At Guleli, river Madei meets river Ragao/Ragoda, originating from two tributaries, Tambdi Surla and Anvaldem of Mollem village in Dharbandora Taluka. These rivers meet Madei near Birondem. Further, Madei meets another river known as Khandepar near Sonarbag with its main source in Karnataka traversing through Dudhsagar falls and Bhagwan Mahaveer Wildlife Sanctuary. There are few streams which are perennial at the upper portion and dry in the middle. The water is available however down stream. This factor requires silt management by introducing dry stone dam and de-siltation of particular area in question.

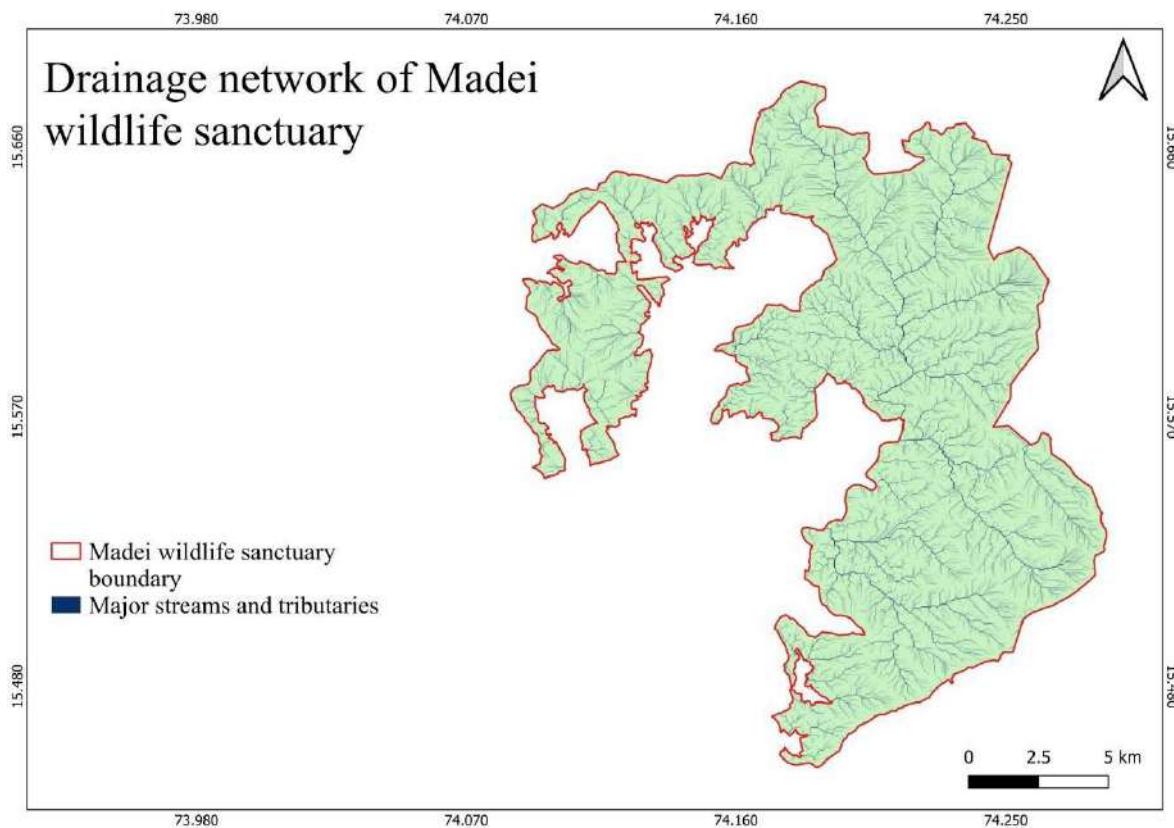


Figure 10: The drainage patterns map of Madei river basin in the sanctuary.

2.5.1 OTHER WATER SOURCES—CHECK DAM, WATERHOLES, DISTRIBUTION OF WATER SOURCES AND SEASONALITY.

2.5.2.1 CHECKDAMS

Check dams are constructed over small stream rivulets to prevent soil erosion, improve percolation of water and to ensure water supply throughout the year for wildlife. At present the sanctuary has 78 check dams. Some of the check dams dry up during summer. Such check dams need to be maintained and desilted annually for proper functioning. Details of check dams in Madei Wildlife Sanctuary are provided in table1.

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Table 1: Details of check dams in Madei Wildlife Sanctuary

Sr.No.	Round	Beat	No. of Check Dams
1	Charaunem	Gululem, Ivrem, Pale, Surla	26
2	Codal	Codval, Derodem, Codal,	34
3	Caranzol	CaranzolII, CaranzolIII, Caranzol III, Caranzol IV Assodem, Pendral	18
			78

2.5.2.2 WATERHOLES

During dry season, most of the streams dryup and there is more demand for water. To combat the issue of water scarcity during this period, efforts were made by the Sanctuary management to create water holes at strategic points.

During the current plan period, more emphasis should be given to improve the water storage capacity of the sea waterholes. At present, there are only 54 waterholes in the PA. Therefore, there is a need for more waterholes to be created for mitigating the water availability requirements of the animals. Details at **Annexure VI**.

2.6 RANGE OF WILDLIFE, STATUS, DISTRIBUTION AND HABITAT

The distribution of wildlife in the sanctuary fluctuates seasonally. During monsoon season, the wildlife distribution is relatively wide spread; however, during summer season, wildlife mostly confines themselves to water available areas.

2.6.1 THE BIO-GEOGRAPHIC CLASSIFICATION

The sanctuary belongs to Biogeographic Zone five, i.e., “Western Ghats”. The sanctuary belongs to biotic province “5A Western Ghat Mountains” as per the classification by Rodgers and Panwar (1988). The sanctuary represents the following biomes.

- I. Tropical evergreen forests
- II. Tropical semi-evergreen forests
- III. Grasslands

The Madei Wildlife sanctuary hosts many endemic flora and fauna. The forest vegetation is mostly tropical with significant classification as made by Champion and Seth (1968) described in subsequent paras.

2.6.2 VEGETATION

2.6.2.1 FOREST TYPES

The forest type is determined by topography of the terrain, locality factors, geology, edaphic and biotic factors, climate, drainage system, habitat, number of rainy days and quantum of annual precipitation, soil moisture regime etc. Interaction of these parameters through a prolonged process of evolution within a plant community at its saturation level i.e. climatic climax stage evolves an ecosystem of unique character to form a forest type. Forests are mainly confined to western aspects and foothills of the sanctuary area. As per the classification of the renowned Silviculturists, Champion and Seth, following broad forest types are identified in Madei Wildlife Sanctuary.

A. 1A/C4-West Coast Tropical Evergreen Forest:

At the foothills of Western Ghats along streams and deep gorges having deep fertile soil and favourable moisture regime, luxuriant vegetation emerges. Typical evergreen chunks are conspicuous at Codal, Caranzal, Zadani,

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Codval, Brahma Karmali and Vagheri. Species composition of evergreen forests generally consist of *Mangifera indica*, *Hopea whitiana*, *Mesua ferrea*, *Machilusma crantha*, *Oleadioica*, *Caralia bracteata*, *Polyalthia fragrans*, *Myristica fragrans*, *M. malbarica*, *Alseodaphne semicarpifolia*, *Holigarna arnotian*, *Diospyros oocarpa*, *Actinodaphne angustifolia*, *Litsea whitiana*, *L. stocksii*, *L. decanensis*, *Callophyllum tomentosum*, *Glycosmis pentaphylla*, *Ixora coccinia*, *Mimusop sedule*, *Melastoma malabthricum*, *Ardisia solanacea*, *Gymnostachium latifolium*, *Desmodium triquetrum*, *Flacourtia montana*, *Lophopetalum whitianum*, *Mimusops elengi*, *Cinnamomum zeylanicum*, *C. macrocarpum*, *Garcinia gumigatta* and *Beilschmiedia fagifolia*. Common climbers are *Gnetum ula*, *Entada pusaetha*, *Piper nigrum*, *Caesalpinia nuga*, *Wagatia spicata* etc. Amongst ferns species *Pleopeltis*, *Selaginella*, *Angiopteris*, *Osmunda*, *Lygodium* are found.

B. 1E1-CaneBrakes:

In the evergreen forests dense cane growth occur along perennial streams and damp favourable localities. Canebrakes also harbor in the interior areas having humid conditions. Important Cane species found are *Calamus thwaitesii* and *C.pseudo-tenuis*.

C. 1E2-WetBambooBrakes:

Pure patches of Bamboo occur in moist locality in evergreen forests without anystanding trees. *Bambusa bambos* (Velu) and *Ochalandra talbottii* (reeds) in pure chunks occur at Zadani and Pendraal areas of Sanctuary. *Oxytenanthera ritcheyii* (Chiva bamboo) in pure patches are seen at higher elevation in Surla area.

D. 2AC2-WestCoastSemiEvergreen:

Wet evergreen forest type gradually merges with Moist Deciduous Forest type. In between these two with slightly less humid conditions above the line of streams semi-evergreen species occur. The floristic composition consists of *Hopea ponga*, *Artocarpus lakoocha*, *A. hirsuta*, *Callophyllum tomentosum*,

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C. apetalum, *Mimusops elengi*, *Syzygium cumuni*, *Alstonia scholaris*, *Dalbergia latifolia*, *Memoceylon umbellatum*, *Sterculia foetida*, *Garcinia combogia*, *Kydia calycina*, *Lagerstroemia parviflora*, *Mammea longifolia*, *Tetrameles nudiflor*, *Caralia bracteata*, *Olea dioica*, *Cinnamomum zeylanicum*, *Diospyros oocarpa*, *Pterospermum acerifolium*, *Saraca indica*, *Macaranga peltata*, *Pongamia pinnata*, *Eleagnus conferta*, *Bishofia javanica*, *Flacourtia indica*, *Cordia mixa*, *Ardisia solanacea*, *Murraya koenigii*, *Leea indica*, *Costus speciosus* etc. Common climbers are *Jasminum malabaricum*, *Wagatea spicata*, *Gnetun ula*, *Entada pusaetha* and *Dalbergia sympathetica*. Common bamboo in this type of forest type is *Bambusa bambos* and amongst canes, *Calamus thwaitessi* and *Calamus pseudo-tenuis* are found.

E. 1 E3 Moist Bamboo Brakes:

In the semi evergreen and moist deciduous forests gregarious bamboo occurs along the perennial streams and on gentle shadowed gradient having humid conditions. Most common bamboos are *Bamboo sabambos* and *Dendrocalamus strictus*. Generally, this type occurs in a mixed composition of few standing trees of *Terminalia tomentos* along with other moist deciduous tree species.

F. 2/E4 Lateritic Semi Evergreen Forests:

Over the degraded shallow lateritic soils this forest type occurs. Species composition shows *Xylia xylocarpa* as the main species while other associates include *Terminalia paniculata*, *Pterocarpus marsupium*, *Schliechera oleosa*, *Grewia tiliafolia*, *Strychnos nuxvomica*, *Careya arborea*, *Bridelia retusa*, *Calicoptris floribunda* etc. In Madei Wildlife Sanctuary this forest type occurs at Zorme, Dabem and Bramha Karmali areas.

G. 3B/C2-Southern Moist Mixed Deciduous Forests:

Moist Deciduous forests are found at the foothills of Western Ghats on gentle and undulating terrain. Most of the species are of heterogeneous composition with wide range of diversity. Majority of tree species are essentially

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deciduous and shed their leaves over a period of the year. In Goa this forest type occupies larger extent compared to other types. In Madei Wildlife Sanctuary as well moist deciduous forests cover over maximum extent. Some evergreen and semievergreen species do occur in this type along nallah banks and wet ground. In the lower storey few evergreen species occur due to over head shade and humid condition. Common species occurring are: *Terminalia tomentosa*, *T. belerica*, *T. paniculata*, *T. chebula*, *Lagerstroemia parviflora*, *Xylia xylocarpa*, *Adina cordifolia*, *Mitragyna parvifolia*, *Artocarpus lakoocha*, *Syzygium cumuni*, *Lannea grandis*, *Spondias mangifera*, *Fragara badruna*, *Semicarpus anacardium*, *Radermachera xylocarpa*, *Holoptelia integrifolia*, *Stereospermum suaveolens*, *Albizia lebbek*, *A. procera*, *Dillenia pentagyna*, *Grewia tiliifolia*, *Trema orientales*, *Dalbergia latifolia*, *Pterocarpus marsupium*, *Mimusops elengi*, *Ficus bengalensis*, *F. aspirima*, *F. glomerata*, *Careya arborea*, *Emblica officinalis*, *Schleichera oleosa*, *Bridelia retusa*, *Macranga peltata*, *Mallotus philippinensis*, *Butea monosperma*, *Bombax malabaricum*, *Caryota urens* (Birlamad), *Alstonia scholaris*, *Aegle marmelos*, *Hydnocarpus kurtzii*, *Acacia catechu*, *Buchanania lanzan*, *Kydia calycina*, *Gmelina arborea*, *Flacourtia montana*, *Randia dumetorum*, *Ziziphus jujuba*, *Holorrhena antidysentrica*, *Tabernemontane heyeneana*, *Coolbrookia oppositifolia*, *Callicarpa lanata*, *Microcos paniculata*, *Strobilanthus callosus*, *Clerodendron infortunatum*, *Vitex negundo*, *Carissa caranda*, *Ixora parviflora*, *Leea indica*, *L. macrophylla*, *Helicteres isora*, *Musaenda glabrata* (frondosa), *Flemingia bracteata* etc.

Among climbers *Acacia concinna*, *Smilax zeylanica*, *Jasminum malabaricum*, *Abrus precatorius*, *Ziziphus rugosa*, *Gnetum ula*, *Gloriosa superba*, *Calicoptris floribunda*, *Mucuna pruriens*, *Bauhinia valhi*, *Entada puseatha*, *Dioscorea species*, *Wagatia spicata* etc. Common bamboo so occurring are *Bambusa bambos* and *Dendrocalamus strictus*.

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H. 3B/C2/2S1- Southern Secondary Moist Mixed Deciduous Forests:

These are secondary forests emerged entirely due to biotic interference. Past Kumeri (Shifting cultivation) areas show few scattered left-over trees as survivors following slash and burning operation. These areas are virtually exposed, degraded, devoid of top soil and at places lateritic out crops are visible. Original tree stand is not seen in this forest type but few coppice growth of original forest vegetation besides stunted and malformed scattered trees are found. Common species mostly found are *Terminalia tomentosa*, *T. paniculata*, *Dillenia pentagyna*, *Careya arborea*, *Strychnos nuxvomica*, *Lannea grandis*, *Emblica officinalis*, *Alstonia scholaris*, *Lagerstroemia parviflora*, *Mitragyna parvifolia*, *Adina cordifolia*, *Bombax malabaricum*, *Randia dumetorum*, *Trema orientalis*, *Ziziphus jujuba*, *Carissa caranda*, *Clerodendron infortunatum*, *Holorrhena antidysentrica*, *Strobilanthes callosus*, *Calicopteris floribunda*, *Ziziphus rugosa*, etc.

I. 8A/DS1-South Indian Sub-Tropical Hill Savannah Woodland:

Due to incessant forest clearance and burning of sub-tropical evergreen forests for obtaining palatable fodder grasses for cattle and goats by the Shepherds at high altitude of the Western Ghats, a typical retrograde forest type has emerged over a prolonged period. This type is conspicuous by its vegetation and grassland at Vagheri hills and high slopes of Zorme and at Gullulem of Madei Wildlife Sanctuary. Commonly found species are *Syzygium zeylanicum*, *Dalbergia latifolia*, *Emblica officinalis*, *Olea dioica*, *Phoenix humilis* (sylvestris) at Zorme besides *Melastoma malathricum*, *Clematis gouriana*, *Wendlendia nothiana* and variety of grasses occur. These areas are subjected to heavy wind velocity and the foliage size of tree species is comparatively reduced.

The comparison of structure and composition of forest types indicate that the anthropogenic pressures coupled with the adverse climatic conditions

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have brought about changes in the vegetation types in the past and these pressures are continuing.

Details of Floral Diversity of Madei Wildlife Sanctuary **Annexure VIII.**

2.6.2.2 PLANTATIONS

Apart from the natural vegetation, the Forest department have carried out plantations of Acacia and Teak in the past. For habitat enrichment, department carries out plantation of indigenous species, especially fruit bearing. Further, as a vegetative measure for soil and moisture conservation, plantations of bamboo and cane have also been carried out at suitable places.

2.6.2.3 INVASIVE PLANT SPECIES

Eupatorium is the main invasive species present in the Sanctuary and sporadic patches of *Lantana camara* and *Parthenium species* are also seen in very small pockets mainly along the roads passing through the sanctuary.

2.6.3 Animals

Population estimation of wild animals is being conducted periodically in the Sanctuary. Department carries out monitoring of wildlife through various direct and indirect measures, including camera trap and use of specific app like, M-STripes etc. The related data of wildlife presence is compiled on regular basis and is available with the division.

2.6.3.1 Vertebrates, their status distribution and habitats, habitat quality and key areas

I. The leopard/Panther:-(*Panthera pardus* Linnaeus)

It is locally known as the “Bibto Wagh”. Normally they live in scrub forests in village proximity. The panthers are frequently seen; however, their number is yet to be assessed correctly. Panther is a Schedule I animal. Natural food scarcity and territorial competition compels the panthers to stray out around

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habitation. Black Panther (Melanistic Leopard) is occasionally sighted in the sanctuary.

II. The Wild Dog/Dhole (*Cuon alpinus*)

It is locally known as “Devcolo” or “Kolsundo”. They are seen in packs of 6-14. They rarely enter into human habitation areas as well. There are incidents of pulling down smaller calves of livestock if found free range grazing in forest areas. They are highly mobile and cover large tracts of forests in search of prey. The pack has been observed moving across the hill ranges into reserve forests outside Wildlife Sanctuary. Pups have been photographed and documented along with mother in forests of Madei Wildlife Sanctuary and monitored till they become adult. It is established that Wild dogs have been breeding in forests of Madei Wildlife Sanctuary.

III. The Jungle Cat (*Felis chaus*)

Locally known as the “Baul” or “Bauko”, the species is spread over entire Madei forests. They enter into human settlements in search of livestock, like poultry and goat kids. They are elusive in their habits and movement goes undetected many a times. The Madei forests have breeding population of Jungle cats species, however their exact number is not known.

IV. The Sloth Bear (*Melurus ursinus*)

Locally known as “Vashel” or “Aswal”, they are recorded in forests of Madei and there is good population around hilly tracts of Madei Wildlife sanctuary, mostly occurring in areas of Surla, Golauli, Pali, CodalSatrem, Jadani, Pendral and Codval. The sloth bears in Madei are crepuscular in Nature and are observed descending down the hills in search of fruiting trees at night and retrieve back into hilly tracts by early morning. The foraging sites of sloth bear is influenced by fruiting patterns of various trees in forests of Madei wildlife sanctuary. The *Syzigium cumini* and *Artocarpus integrifolia* are two favorite tree species for the sloth bears and they cover large distance

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in search of ripened fruits of the same. There are hundred recorded incidences where local people have accidentally been mauled by sloth bear. The victims have been suitably compensated by Goa Forest Department.

V. The Smooth Coated Common Otter (*Lutra lutra*)

Locally known as “Udh” or “Udh mazor” occurs along the streams and stagnated water pools and feed up on fish, crabs, frogs, and other aquatic life. The smooth coated otters are recorded by direct sightings and also by indirect evidences of latrines sites and burrow along the bank of river Madei. The pack ranges from 4 to 8, observed foraging for fish in Madei river and its other tributaries, there is breeding population of Otters in Madei wildlife sanctuary.

VI. Sambhar (*Cervus unicolor*)

Locally known as “Meru”. The species is inhabitant of dense forest and mostly occurring on forest tracts all along hill slopes of Madei Wildlife Sanctuary, occasionally this animal enter the horticulture farms in search of green vegetations or even over ripen fruits proximity of cultivation. It is a very important prey of tigers. It is said that ‘Sambar conservation is Tiger conservation’.

VII. Spotted Deer (*Axis axis*)

Locally known as “Chital”, a browser, they prefer dense forests and open patches having good brows in grounds and perennial water source.

VIII. Barking Deer (*Muntiacus muntjak*)

Locally known as “Bhekaro”. They prefer dense forests and hill slopes and is diurnal in habit.

IX. Gaur or Indian Bison (*Bos gaurus*)

The state animal of Goa, locally known as “Gavo”. Gaur is Schedule I animal. The forests tracts of Madei supports large number of gaurs and the herd size of the gaur in the sanctuary ranges from 8 to 17 in numbers. The gaur herd

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on the periphery of sanctuary some times strays into horticultural plantation of the adjacent areas and do crop damage, this mainly takes place at night. The villagers have been availing scheme of power fencing by Agriculture Department to keep this animal away from their crop. There are incidents of tiger preying on gaur in sanctuary and carcasses have been seen. There are ample number of herds in the Sanctuary area.

X. Mouse Deer (*Tragulus memminna*)

Locally known as “Pisoi”. Very shy animal having slow movements and hence easy to hunt. Of late their population has sharply fallen and the animal is categorized under Schedule I.

XI. Pangolin (*Manis crassicaudata* Gray)

Locally known as “Thiryo”. It is a threatened species and is a Schedule I animal.

XII. Slender Loris (*Loris tardigradus* Linnaeus)

Locally known as “Van Manus”. It is an endangered species. Nocturnal, shy and slow, hence fall prey to trapping and smuggling. Highly in demand to possess as pet.

Other mammals found in the sanctuary are Small Indian Civet (*Viverricula indica* Desmarest) known locally as Javde, Leopard Cat (*Felis bengalensis* Kerr) locally known as Wagatti a Schedule I animal, Malabar Squirrel (*Ratufa indica*) locally known as Shenkro, Common Flying Squirrel (*Petaurista petaurista*) known as Ud Pakho, Flying Fox (*Pteropus giganteus*) known as pakho, Horse Shoe Bat (*Rhinolophus luctus*) known as Vaghul-Dormer’s Bat (*Pipistrellus dormeri*) known as, vaghul, Wroughton’s Free Tailed Bat (*Otomops wroughtoni*) also known as Vaghul, a Schedule I animal and is an endemic species which visit Madei Wildlife Sanctuary for food from adjoining Barapede caves in Kankumbi village of Karnataka, Bandicoot rat (*Bandicoota indica*) known as Kolinder, Three Striped Palm Squirrel (*Fanambulus palmarum*) known as

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Chani/Khar, Indian Field Mouse (*Mus budooga*) Undir, House Rat (*Rattus rattus*) Undir, Indian gerbille (*Tatera indica*) Undir, House Shrew (*Suncus murinus* Linnaeus) Known as Chuchunderi, the Palm Civet (*Paradoxurus hermaphroditus*) commonly known as Katannoor, Jackal (*Canis aureus*) commonly known as Kolo, Porcupine (*Hystrix indica*) locally known as Sal, The Common Mongoose (*Herpestes edwardsii*), The Wild Boar (*Sus scrofa*) known as Ran Dukar, the Indian Hare (*Lepus nigricollis*) locally known as Samso. There are two species of monkeys found in Goa. The common Langur (*Presbytis entellus*), and Bonnet Macaque (*Macaca radiata*) locally known as Makad.

Annexure IX.

AVIFAUNA

Species diversity of birds is quite rich in the sanctuary area. As per the checklist of researchers in all 254 species of birds have been recorded so far. The sanctuary area has been identified as breeding ground for many bird species including seven endemic species, Viz Long-billed Vulture, a critically endangered species, vulnerable Nilgiri Wood Pigeon, threatened Malabar Pied Hornbill besides a migratory Eurasian Golden Oriole. The avifauna found in Madei Wildlife Sanctuary are given in the check list at **Annexure X.**

REPTILE

Reptiles are represented by Snakes, Lizards and geckos and two species of turtles from Madei wildlife sanctuary. The details of the same with local names are given in **Annexure XI.**

Geckos found in Madei Wildlife Sanctuary:

Dwarf Gecko, Banded Gecko, Bark Gecko, Brooke's Gecko

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Common Amphibians found in Madei Wildlife Sanctuary:

The diverse ecosystem and good water regime in the Madei wildlife sanctuary influences the diversity of amphibians and they are seen almost in entire areas of sanctuary. The lateritic plateaus in Madei wildlife sanctuary come alive with amphibian population in monsoon and they use the water substratum for breeding purposes, there are frogs which use escarpments near waterfalls for breeding purposes in Madei wildlife sanctuary.

2.6.3.2 Important invertebrates, their status, distribution and habitat

There are no much details available on invertebrates of the sanctuary except butterflies. Among Annelids, there are leaches and diverse worms. Many types of crabs (Crustaceans) are also encountered. Ticks, Mites and Spiders are also present in the sanctuary. Among “Insects”, different types of flies, beetles, butterflies, moths, dragonflies etc. are also present. But except butterflies, none of the other groups are studied in detail.

2.6.3.2.1 Butterflies

Various sources have reported about 254 species of butterflies in Goa. Madei Wildlife Sanctuary is Rich in butterfly diversity. Common Butterflies observed in the sanctuary area are: Glassy Tiger, Common Emigrant, Plain Tiger, Common Jezebel, Common Grass Yellow, Crimson Rose, Common Mormon, Tailed Jay, Common Evening Brown, Common Baron, Tawny Coster, Peacock Pansy, Lemon Pansy, Red Peirrot, Common Silverline, Bluebottle, Lime Butterfly, Common Sailor, Blue Pansy, Malabar Tree Nymph, Common Indian Crow, Mottled Emigrant, Common wanderer, Pioneer, Dark Blue Tiger, Stripped Tiger, Common Hedge Blue, Danid Eggfly, Great Eggfly, Restricted Demon, Southern Birdwing, Common Bluebottle, Common Mime, Paris Peacock, Malabar Banded Peacock, Tamil Lacewing (Endemic to Western Ghats), Clipper, Grey Count, Common Rose,

CHAPTER 2 – BACKGROUND INFORMATION AND PROTECTED AREA ATTRIBUTES

Malabar Raven, Blue Oak leaf, Blue Mormon etc. The checklist of Butterflies found in Madei Wildlife Sanctuary is given in **Annexure XII**.

2.6.4. Identification of habitats and habitat use by wild animals

The Sanctuary is a part of Western Ghats and is located on the eastern aspect of Goa. There is less variation in site factors owing to which the variation in habitat is also less. However, the forests are interspersed with plateaus. Generally, the vegetation consists of tropical evergreen and semi- evergreen, moist deciduous forest along with cane brakes and wet bamboo brakes. Heavy undergrowth of *Strobilanthus* is seen in major pockets of the Sanctuary. However, herbivores are commonly seen in these areas. The sole reservoir of Anjunem irrigation project is bordering the Sanctuary on Western boundary.

CHAPTER3

HISTORY OF MANAGEMENT AND PRESENT PRACTICES

3.1 GENERAL

Western Ghats are known for their pristine and luxuriant vegetation from very early history. Ownership of forests, as a tradition was claimed by the de-facto rulers of the time. From the available historical records, it does not appear that there was a separate establishment any time to look after forest management nor there was any system in operation for felling of trees until the Portuguese regime. However, valleys are filled with rich soil up to the stream banks. The Madei Wildlife sanctuary has been carved out of Valpoi Forest range, originally under the jurisdiction of North Goa Forest Division prior to the notification declaring the area as sanctuary. The sanctuary falls entirely in ‘Sattari’ Taluka in North Goa District. The Goa Forest department was created and it was designated as “Forest department” during the year 1961.

This department had taken up the management of all the government forests in North Goa and it was headed by Deputy Conservator of Forests, North Goa. Large number of human settlements had lead to Cumeri cultivation which was subsequently abolished, as a part of management coupes of monoculture plantations of Teak, *Eucalyptus spp* and *Acacia auriculiformis* were undertaken. Thereafter, this area was brought under Wildlife & Eco Tourism Division (North) upon creation of Madei Wildlife Range.

3.1.1 SANCTUARY ESTABLISHMENT

The Sanctuary was established in the year 1999 vide notification No.2-333-99-FD/A-Part/940 dated 31st May 1999 and No.2-333-99-FD/A-Part/940 and 2-333-99-FD/APart/941, dated 31st May 1999. Copy of the notification is given in Annexure I.

3.2 REVIEW OF PAST MANAGEMENT PLAN

This is the first management plan for the Sanctuary. Following measures are being taken by the department for the scientific management of the wildlife sanctuary

1. **Soil and moisture conservation** – Both, vegetative and engineering measures have been taken to check soil erosion and to ensure water recharging. Structures like check dams, gabions, retaining walls, trenches, grade stabilizers, loose bolder check dams, water ponds etc have been constructed at suitable locations. In addition, plantation of bamboo, cane along the rivulets, nullha etc have also been taken up to augment the objective of soil and moisture conservation efforts.

2. Management of waterholes and checkdams

a) Waterholes

The animals, experience scarcity of water during dry season. Efforts were made by the forest officials in the past to identify the animal corridors to provide more water holes and to maintain the existing ones by way of desilting.

b) Checkdams

The Forest department has constructed check dams over small streams to improve the water availability throughout the year for Wildlife, prevent soil erosion and also to recharge the water table. At present the Sanctuary has 78 checkdams.

c) Biodiversity enrichment practices

For qualitative and quantitative improvement of the forest through richness of species and its diversity plantation of various fruit bearing tree species, canes, bamboos and other indigenous forest species are being taken up on regular basis at suitable locations. One of the focuses of the department is to plant fruit bearing species and palatable grasses to ensure availability of food for the wildlife including avifauna in the sanctuary. This is one effort to check man animal conflict by discouraging animals straying outside the wildlife sanctuary for food. Details of enrichment plantation is at **Annexure XIII** and details of restoration of grass plot is at **Annexure XIV** and Creation of Grass Plot is at **Annexure XV**

Table 2 : Details of Teak/ Cane /Rubber/ Bamboo/ Eucalyptus Plantation in Madei Wildlife Sanctuary

Sr. No	Beat	Type of Plantation	Area Approx. (in Hectare)
1	Satrem	Rubber	20
2	Ivrem (Gotnar)	Cane	05
3	Ivrem (Patrolling station)	Eucalyptus	20
4	Caranzol IV	Teak	15
5	Caranzol I	Acacia	01
6	Golaulim	Bamboo plantation	03
	Total		64

Source : MWLS Range Records

- b) View line clearance – The frequently used roads are cleared of 10m wide vegetation on either side once every year is undertaken. The clearance of shrubs and herbs induce to re-establish new shoots which are best fodder for the browsers and thus animals get attracted in cleared areas, secondly, the clearance on both sides plus the road in total 25m increases sightings for the vehicles passing on the roads avoiding the threat of accidents for both animals as well as humans. The view line clearance helps to increase sighting of wild animal for tourists too.
- c) Management of invasive species – To check natural competition through Invasion of weeds, various measures are being taken by the department. In this series *Eupatorium* plant is regularly removed from identified sites to facilitate aided natural regeneration's and other plantations. Weed removal is one of the imperative habitat improvement practices, vital for herbivores. The weed eradication is carried out by maintaining the indigenous secondary growth.

3.3 FOREST PROTECTION

The forests are regularly patrolled to protect both the flora and fauna. At strategic locations, anti poaching and patrolling camps, are set up and vigilance maintained round the clock. A 9 mm Pistol has been provided to Range Forest Officer along with walkie talkies and mobile sets. Patrolling is carried out on foot, motorcycle, and jeeps. The wireless network, is very useful in assisting the officials in protection activity at remote areas.

3.3.1 LEGAL STATUS

Madei Wildlife Sanctuary is constituted as per WLP Act 1972. The Sanctuary was established in the year 1999 vide notification No.2-333-99-FD/A-Part/940 dated 31st May 1999 and No. 2-333-99-FD/A-Part/940 and 2-333-99-FD/A-Part/941, dated 31st May 1999. Several managerial interventions which includes deployment of Fire Watchers / Trekkers, establishment of Anti-Poaching Camps, Patrolling Camps / Check gates with sufficient manning, regular

patrolling and combing activities with all protection measures are undertaken through State, CAMPA & CSS schemes.

3.3.2 LEASES

There is no mining or any other leases in the Madei wildlife Sanctuary.

3.3.3 Administrative Units

The Sanctuary is under the administrative control of Wildlife & Eco Tourism Division (North) Division with Deputy Conservator of Forests & Wildlife Warden, with his head office at Panjim. An Assistant Conservator of Forests administers the day-to-day work of the sanctuary with the office located at Panaji. The Sanctuary itself is a Forest Range created during 2011 headed by a Range Forest Officer who is the executive in charge of the Range.

The Range is further divided into 3 Rounds and 16 beats under the direct charge of a Forester and Forest Guard respectively. Forest Guards are responsible for the protection and other work in the beats. In addition to the protection staff, fringe area forest dependent people are employed on daily wages for protection works inside the sanctuary. At present there are only 16 forest Guards working as against a required strength of 25. Considering the area of the sanctuary and its management problems, the present strength of protection staff is inadequate. There is also acute shortage of departmental quarters to provide housing facilities to the existing staff. Office of the Range Forest Officer is housed in a departmental building at Maloli, Sattari Goa. Many of the officers and other ministerial staff do not have departmental residential quarters and reside in rented accommodation.

Six watch towers have been constructed between the year 2013-2022 and few more must be constructed and the old ones must be maintained. Despite acute shortage of staff and infrastructural facilities, considerable work has been done in water shed management and habitat improvement. Great efforts have been put to maintain the forests road by constructing culverts and causeways

to these roads, enabling the officers and staff to move within sanctuary throughout the year.

Despite of the shortage of the basic staff, the forests are greatly protected from fire damage, poaching, grazing and illegal felling. Range Forest officer and staff has been provided with vehicles for performing duty. Administrative offices have been provided to RFO and Round Foresters and checking barriers are erected for effective protection.

The details are as under

Range : Madei Wildlife Sanctuary with office at Maloli

Rounds : Charaundem, Codal & Caranzol

Beats : Surla, Pale, Ivrem , Gullulem, Codal. Nanorem, Satrem ,Derodem , Vaiguinim, Codval, Caranzol I , Caranzol II, Caranzol III, Caranzol IV, Assodem and Pendral.

3.3.3.1 DETAILS OF STAFF STRENGTH

Details of existing staff strength is given at **Annexure XVI**.

3.3.4 INFRASTRUCTURE FACILITIES:

The infrastructure in Madei wildlife Sanctuary consists of civil structures consisting of Office buildings, Anti-poaching camps or Patrolling stations, Check posts, Watch towers at **Annexure XVII**.

3.3.4.1 BUILDINGS

At present no residential quarter is available for the Range Forest Officer and also for the foresters, in the Sanctuary. There are ten patrolling/anti-poaching camps and the forest guards reside in these camps along with the trekkers. The heavy rainfall in the area necessitates regular maintenance of these buildings to be habitable.

3.3.4.1 ANTI-POACHING CAMPS

There are 5 inter state entry points in the Sanctuary namely Surla, Parvad, Chikalaye, Holda and Krishnapur. Out of the five entry points, Surla and Parvad has anti-poaching camps cum patrolling station and gates. Besides this anti-poaching camps and check post are also located at different location as shown at **Annexure XVIII**.

3.3.4.2 Check post

Many roads including state high ways and important district roads pass through the sanctuary. Few of these roads are connecting adjoining states. Border areas in the neighboring states are also rich in biodiversity and are prone to wildlife trade. Hence forest checkpoints were established in the border areas. The checkpoints are set to curtail any illegal movement of forest produces. The details of forest checkpoints and checkgates is at Annexure XVIII.

3.3.4.3 CHAIN GATES/BARRIERS

There are many roads and trek paths laid out within the sanctuary and many of such paths are less frequented by vehicular movement. The chain barriers are erected on paths to regulate unauthorized movement of vehicles which can be possible threat to wildlife and timber trees in the sanctuary. Hence chain barriers are erected in such remote locations, wherein deploying watch and ward staff is difficult or not required, the people residing within the sanctuary are having the right of passage therefore these paths cannot be blocked. The details of chaingates / barriers are established details of them are given in Annexure XVIII.

3.3.4.4 ARMS AND AMMUNITION

The Madei Wildlife Sanctuary has no threat of organized poaching. Keeping this in view firearms were not provided to field staff, however Range Forest Officer has been provided with one 9 mm pistol of IOF make with sufficient number of ammunition's. The said weapon is issued to RFO. The

Range Forest Officer has been trained in use of the said firearm in any eventuality.

3.3.4.5 ROADS AND TREK PATHS

The Madei Wildlife Sanctuary has tarred roads connecting human settlements to taluka headquarter Valpoi. The well-established network of forest road, some of which are tarred/Black topped and some are forest roads which are water bound macadam roads. The roads connecting to various human settlements in wildlife sanctuary are manned with check gates and check posts, in order to regulate vehicular movement and also keep vigil on any illegal practices/ threats to wildlife. Apart from roads, several trek paths are also maintained which are used by the staff for regular perambulation and protection which connects almost all parts of the sanctuary in a network. These are having important role in protection and monitoring of wild animals and its habitat including fire suppression. Most of the roads are motorable roads. List of the same is given below. The Range wise abstract of the roads and trek paths are given in **Annexure XIX**.

3.3.4.6 VEHICLES

The mobility to field staff in day-to-day works is utmost important, hence the field staff has been provided with vehicles for better mobility owing to vastness of the area. The area being highly undulating and remote with hostile terrain in rainy season the range forest officer has been provided with four-wheel drive vehicle for easy accessibility to remote areas in sanctuary. The range office has also been provided with mini tanker which caters to supply of water to artificial water holes in wildlife sanctuary during drier months. The frontline staff has been also provided with adequate number of two-wheelers for mobility during day-to-day access to areas and also attending wildlife rescue or wildlife emergency calls. The mobility to frontline staff has helped in curbing illegal activities and also to reduce the response time of the front-line staff in any eventuality. The level of protection has also increased manifold due to regular

presence of field staff in remote areas of sanctuary.

Table No 3:Details of Vehicles Available at Madei Wildlife Sanctuary

Mahindra Bolero	01
Mahindra Camper	02
Tata 407 mini truck	01
Two Wheelers	09

3.3.4.7 WIRELESS AND OTHER MODES OF COMMUNICATION

Wireless is one of the extensively used communication tools in the Sanctuary for protection works, as mobile network is presently not available in most parts of the Sanctuary. The division has only one repeater station at Surla, 10 Walkie sets, 04 Static sets and 01 mobile sets for the protection of the sanctuary. It is proposed to provide walkie sets to all 35-executive staff, check gates, and every anti-poaching cum patrolling squad. The sanctuary should have at least a minimum of another 50 sets.

High band Wireless network has been set up during 2008-09 and new wireless instruments have been provided details are given at **table 4**.

Table No.4: List of Wireless communication equipment at Madei WLS

Type of instrument	Number	Place of installation
Static sets	04	RFO office, Codal Patrolling Camp, Gullulem Patrolling camps and Pali APC
Mobile sets	01	RFO Jeep

Walkie talkie	10	RFO and frontline staff 9 sets
Repeater	01	Surla

However, during monsoon the wireless network is not effective as the solar chargers do not function and the camps are not electrified. Also because of heavy rainfall and wind, the repeater station and solar panels are liable for damage.

TELEPHONE:

Postpaid Mobile connection sim cards are provided to the executive staff which enable them communicate with each other. However, there is no sound mobile network availability and no internet facility in most part of Wildlife sanctuary area at present. The efforts are being put in to rope in services of BSNL for providing better connectivity, they have been requested to explore avenues to provide network inside wildlife sanctuary, as it will enable the frontline staff in using APP based software in day-to-day monitoring, they do and this will create scientific data base of wildlife sanctuary. The BSNL is in process of enhancing the network by erecting new towers in various areas adjacent to wildlife sanctuary and also in settlements embedded inside sanctuary.

3.3.4.8 EQUIPMENT

The scientific management of forest can be achieved by using modern technology with which desired results can be obtained at different levels like protection, monitoring, creating data base or execution. The Various equipment to carry out forestry and wildlife management related works have been provided to the frontline staff and training in this regard is also given to them. The modern equipment for carrying out rescue of wild animals is provided to field staff which helps them in rescuing the animal at the same safety of the rescuer is ensured. Similarly in recent years forest fire is major hazard taking heavy toll

of forest, hence field staff has been provided with adequate firefighting equipment and safety gadgets. The other equipment provided to frontline staff includes GPS, Camera Traps, Field Kits etc., and these are made available at each Anti-poaching stations and also at the range forest office.

3.4 PROTECTION ISSUES AND STRATEGIES

Field patrolling is the most effective method for protection. Forests are regularly patrolled to protect both, the flora and fauna. Local people familiar with the forests are engaged as trekkers. Wireless sets are provided to all the Forest Guards for better communication. Anti Poaching Camps/ Patrolling Camps, Check posts, chain barriers, checkgates and watch towers are also constructed at various strategic locations in the sanctuary.

The major protection threats are as under: -

- 1 Destruction/Fragmentation of habitat
- 2 Illegal felling of trees & small timber.
- 3 Cultivation within the Sanctuary by sanad holders / Private Estates
- 4 Domestic livestock grazing
- 5 Forest Fire
- 6 Agricultural land and Cashew plantation on the periphery of the Sanctuary.
- 7 Poaching
- 8 Man-animal conflict
- 9 Exotic and Invasive weeds
- 10 Possession of arms by the agriculturists. `
- 11 Soil Erosion
- 12 Imminent flowering of bamboo
- 13 Trespassing into the Sanctuary.
- 14 Drying up of streams and waterbeds in summer
- 15 Disease and pests

However, despite these odd factors, the Sanctuary still harbors a remarkable diversity of flora and fauna. In addition to its inherent ecological value, the Sanctuary is valued for its tourism attraction and livelihood needs. This creates significant challenges to the Sanctuary Managers for managing the impacts of various stakeholders.

3.4.1.1 ILLEGAL FELLING OF TREES

Illegal felling of trees was one of the main protection threats in the sanctuary in the early days. Cases of illicit felling of trees and theft of small timber are reported now and then. However, a steady decrease in these incidents is recorded over the years and regular patrolling, improved protection measures, awareness generation among the local people, strengthening of intelligence network and perambulation are being done to check these illegal activities. Collection of firewood and other NTFP's occur in various degrees across the sanctuary.

3.4.1.2 MAN-ANIMAL CONFLICT

The human settlements within the sanctuary limits are susceptible to human animal conflict mostly due to horticultural crops which are raided by certain species of wild animals. Sometimes the wild animals also stray into human settlements in search of water during drier period of the year which again gives rise to conflict. The major population inside sanctuary and on fringe areas are into horticulture and agriculture, very few pastoralists are scattered in remote areas of sanctuary who possess livestock mostly buffaloes. Agriculture is the main source of income and livelihood to the local in this area. Majority of the forest fringes are cultivated with cash crops including coconut, arecanut and horticulture crops etc. Destruction of these crops by wild animals is very common in these areas. The certain area inside and adjacent to wildlife sanctuary are frequented by free ranging cattle grazing and such unattended cattle are prone to Cattle lifting by carnivores. The claims filed before the forest

department are settled as early as possible in order to mitigate conflict and prevent retaliatory killings of wild animals. The movement of people in interior areas of sanctuary also triggers some human attacks, such attacks by Sloth Bears were recorded in Surla and Satrem area. The government notification in force for the grant of compensation on account of loss/damage by wild animals is provided in **Annexure-XX**.

Some of the species which triggers conflicts by raiding crops or straying into human settlements are Bonnet Macaque, Common Langur, Giant Squirrel, Wild Boar, Gaur often come into conflict with human. The details of destructions of livestock, life and property by wild animals and compensation paid are given in **Annexure XXI**.

3.4.1.3 POACHING

The Madei Wildlife sanctuary is free from any sort of organized poaching. However, traditional hunting in the form of Village hunt was practiced in the past during certain time of the year. In recent past such hunts have almost come to nil due to awareness about Wildlife Protection Act and stringent punishments in the matters. The Poaching cases have become rare in Madei wildlife sanctuary. Adequate protection measures are being taken by the department to check occurrence of forest and wildlife offenses at source and in transit including poaching. Protection camps, patrolling paths (Details mentioned in **Annexure XXVI**) have been made across the wildlife sanctuary. No poaching incidence especially of big cats reported in the sanctuary except one case of retaliatory killing which took place in 2020, where in one adult and three sub adult tigers lost their lives. A case was registered in this regard and filed in court of law. Though poaching has been reduced to certain extent, the chances of it still happening cannot be ruled out completely. Infrastructural facilities in the camp sheds should be improved with facilities like bathrooms and toilets, wireless sets, GPS etc. Frequency of patrolling and overnight camping in vulnerable areas to be in effect on a much regular basis. Along with strict enforcement of law, awareness be created among the local communities to

effectively tackle issues such as poaching. The vehicular movement through manned check posts and check gates of sanctuary are monitored 24x7 by staff deployed for the propose. Details of offence booked are given at **table 5**.

Table No 5: Detailsof offences booked including poaching

Sr. No	Year	No. of offences booked
1	2011-12	04
2	2012-13	03
3	2013-14	08
4	2014-15	07
5	2015-16	03
6	2016-17	-
7	2017-18	-
8	2018-19	-
9	2019-20	05
10	2020-21	08
11	2021-22	02
12	2022-23	-
13	2023-24	03

3.4.1.4 DOMESTIC LIVESTOCK GRAZING

The existence of cattle in and around the sanctuary is a potential threat for outbreak of diseases like foot & mouth, anthrax, etc. Cattle have been seen grazing in the sanctuary, especially near the sanctuary boundaries near human habitation and it is one of the biggest threats to the Sanctuary. Periodic Vaccination programme against such disease is conducted with the cooperation of the Veterinary Department to prevent transmission of diseases. The free ranging of livestock is mainly from scattered pastoralists who are referred to as dhangars, there are some habitations in sanctuary areas where they rear buffaloes and milch cows and many times they graze inside sanctuary limits this triggering human animal conflict. Such habitations located deep inside sanctuaries needs to be relocated in order to mitigate such human animal conflict and sanitize the remote forest areas of Wildlife Sanctuary. The Directorate of AH & VS are having schemes for dairy farmers but they insist that the cows or livestock needs to be stall fed and not to resort to free range grazing of livestock, which will definitely reduce the pressure on fodder species of herbivores in Wildlife Sanctuary. Grazing regulations need be imposed as to reduce the pressure of cattle in the core areas by excluding some fringe areas exclusively for the purpose of grazing.

3.4.2 FOREST FIRE

Forest fire is one of the serious problems faced by Sanctuary particularly during the dry season (February to April/May) which leads to destruction of these fragile habitats and causes enormous damage to the ecosystem. There is no natural forests fire reported. However, minor forest ground fires cases have been reported which are accidental or unintentional. Accidental fires result out of careless on the part of smokers, picnickers or travelers in the sanctuary. Some times forest fire is unintentionally set by the local people, also fires are many a time set by pilgrims along roads.

To protect the habitat from fire, protection activities such as integration of fire protection with eco-development activity may be explored. In addition, schemes may be developed for reward and incentive package in conjunction with schemes. Formation of participatory fire management committees and regular maintenance of fire lines will also help in preventing extensive fire in the Sanctuary. Presently, the problem is tackled by maintaining fire lines, and engaging firewatchers.

3.4.2.1 FIRE PRONE / VULNERABLE AREAS

There are few areas prone to fire incidences. The fire prone areas in the sanctuary are shown in figure 11. The forest areas adjoining the roads and habitations are highly sensitive for fire incidences. Tracing Fire lines are effective in such habitats for preventing spread of fires. Cleaning the existing footpaths periodically can also check the spread. The awareness in villages also control Intentional and vandal fires.

3.4.2.2 FIRE PROTECTION STRATEGIES

Fire prevention measures are essential for preventing forest fires. The main objective of the fire prevention planning is to prepare an advance plan of action for preventing and control of fire. The past fire occurrences should be studied and a firemap needs to be prepared. Firewatch towers should be erected at suitable locations. Clearing firelines, man power equipped with modern tools shall be engaged for protection. The firelines tracing should be taken up along the boundary and also along the slopes because fire will travel faster up the slope. Fireline clearance should be completed by the end of January. Fire fighting cells should be placed in each beat in addition to the regular patrolling team.



Figure11: Map showing fire prone areas in Madei Wildlife Sanctuary

3.4.2.1. Fire reporting system

In the past, man power were deployed to trace the fire. Few people were stationed at the highest point of the Sanctuary. A vehicle with water pump/ watertank and 4 staff were stationed at the Valpoi station who can readily act as soon as they receive in formation regarding forest fire. With advancement in technology from last few years department is using FSI generated satellite based SMS alerts of fire incidences on real time for quick response to attend fire occurrences. The Range officers should maintain the details, such as the nature of damage, loss if any, affected locality etc. which can be submitted to the higher authorities. The strategies can be well planned with such past data to protect incidental fires.

3.4.3 PREPAREDNESS OF THE STATE IN COMBATING FOREST FIRE

Forests Department has taken multipronged approach for management of forests fires in State to prevent and control forest fire at policy level, Inter-ministerial (GOI) level, Inter department level and at the level of the local communities. A State Action Plan on Forest Fire is in place which defines roles and responsibility of each authority within the Department and among the various departments during forest fire situation. After careful assessment of fire risk based on the FSI reports / alerts and past experience, a comprehensive forest fire prevention and management plan is prepared every year which *inter alia* includes following forest fire prevention measures:

3.4.3.1 Engagement of fire watchers:

For monitoring and containment of forest fire during fire season, fire watchers are engaged between December to May across state, local youth are deployed for this purpose by imparting basic training along with other staff, they are placed at strategic places to monitor incidence of fire and to inform forest frontline line of respective area on real time basis, so as to control / douse fire in shortest feasible time.

3.4.3.2 Creation of fire line:

Fire lines are created across risky / identified areas by making a buffer by removing dry combustible material in a width of minimum 2 mtrs across forest floor to break continuity of fire creeping on forest floor.

3.4.3.3 Control burning:

Dry biomass on forest floor is medium for forest fire spread, so as to prevent fire, control burning activities are taken up at identified places in forest, along either side of roads and linear ways by gathering and burning dry leaf litters and dry biomass, it is one of most effective ways to reduce fuel load in a controlled environment.

3.4.3.4 Infrastructure:

As stated above, considering fire risk involved, assessment of firefighting equipment is carried out and required number of such equipment and tools are included in annual plan. All the field divisions are equipped with firefighting tools and machinery like mechanized air blowers, mist blowers, rakes and firefighting aprons and other field infrastructures like protection camps, watch towers. Specially designed water tankers, mounted on a Bolero Vehicle, are well suited for undulating forest terrain are helpful in dousing the forest fires.

Table 6: Year-wise forest area affected by fire incidences

Sr No	Year	Beat	Area burnt in Sq mtr	G.P.S coordinates
1	2019-20	Golauli Dhangarwad	250 Sq. mtr.	N 15 38' 79.9" E-074 10' 12.7"
2	2020-21	Caranzol II beat	3000 sq. mtr	1. N-15 30' 24" E-074 13' 55" 2. N-15 30' 20" E-074 13' 54"
3		Caranzol III beat	3000 sq. mtr	1. N-15 30' 27" E-074 13' 50" 2. N-15 30' 28" E-074 13' 53"
4	2021-22	NIL	NIL	NIL
5	2022-23	Caranzol I beat	250 sq. mtr.	N-15' 29' 51" E-074' 12' 09"
6	2023-24	Ivrem beat	38089 sq. mt	N -15°37'56.15" E 074° 7'14.93"
7		Satrem	73358 sq. mt	N -15°37'12.70" E- 074°13'24.10"
8		Surla	13730 sq.mt	N -15°38'8.84" E -074°11'42.13
9		Surla	36401 sq.mt	N -15°38'04.50" E-074°13'03.70"
10		Derodem	25,752 sq.mt	N-15°35'21.09" E-074°13'6.44

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11		Derodem	75,162 sq.mt	N- 15°36'17.40" E-074°14'07.20"
12		Caranzol	44,822 Sq. mt	N 15°32'46.33" E- 074°13'12.81"
13		Caranzol	96,867 Sq. mt	N-15°31'38.61" E-074°12'33.89"
14		Caranzol	22,464 sq.mt	N -15°33'19.12" E- 074°14'6.13"
15		Caranzol	7,156 sq.mt	N-15°33'9.59" E-074°14'35.03"
16		Satrem	26,543 sq.mt	N 15°37'50.02" E-074°12'32.17"
17		Pendral	21,205 sq.mt	N - 15°32'51.83" E- 074°13'39.02"
18		Codval	3,041 Sq. mt	N -15°33'39.81" E-074°15'48.81"
19		Derodem	9,580 sq.mt	N- 15°36'36.25" E-074°13'15.97"
20		Pale	33,335 sq.mt	N-15°34'19.65" E-074° 7'21.95"
21		Surla	8972 sq. mt	N-15°39'0.05" E-074°12'6.79"

3.4.3.5 Trainings and awareness programmes:

All the frontline staff and villagers across sensitive areas are trained periodically to combat forest fire. Further, awareness workshop and programmes are conducted for stakeholders to sensitize about preventive measures to control fire including cause and ill effects of forest fire.

3.5 Wildlife Health Management

Veterinary facilities are necessary for the management of diseases, pests and pathogens detection of the free ranging wild animal. It is required for treatment of sick and injured wildlife, tranquilization of animals, investigations of the illness and mortality of the wildlife populations. Such facilities are yet to be set up in sanctuary and all such cases of injured animals are transferred to Bondla Zoo for veterinary support.

Positive cases for the 'Kyasanur Forest Disease'(KFD), ('monkey fever') was reported from the Sattari taluka in the year 2015, 2016, 2017 and 2018. It is a tick-borne viral haemorrhagic fever endemic to South Asia. The virus is transmitted to human beings through parasitic nymph of ticks which latch on to monkeys. Both human beings and monkeys are victims of the disease, but once a monkey gets infected with the tick bite, it generally dies. The mortality rate in Common langur is very high, Common langur carcasses were encountered in many areas in the year 2015-2016 details of which is provided in table 7. The carcasses were disposed by field staff by burning it under all safety precautions, wherever the cases of dead langurs were reported awareness programme was conducted by field staff with assistance of Officials of health center. The disease being zoonotic disease the field staff were also cautioned and trained to handle such emergency with the help of officials of health department. Except a couple of cases where the cause of death was reported to be accidental, in rest of the cases the reason was not known. The findings of the cause of the death would help to make policy decisions for the better management of Wildlife Population in the sanctuary.

In addition, anthropogenic factors can cause stress and increase risk of disease in the population. The problems associated with cattle grazing have never been addressed before. The effect of this grazing can be direct and in direct or both. There have been no reports of Foot and Mouth disease (FMD) till date since 2016-17.

Table No 7: Details of Monkey carcasses encountered in the year 2015-2016.

Sr. No.	Date	Location	No of carcasses
1	13/04/2015	PaliVillage	03
2	30/12/2015	MauxiVillage	03
3	08/01/2016	KopardeVillage	01
4	09/01/2016	Vagherihill	01
5	20/01/2016	Dabhemvillage	01
6	23/01/2016	Bhironda	01
7	27/01/2016	Keri (Ajoba temple)Village	01
8	30/01/2016	Keri (Moeshi) Village	01
9	02/02/2016	SaleliVillage	01
10	18/04/2017	Ivrem	12
11	18/04/2017	Satrem	03

3.6 ECO-TOURISM

The sanctuary offers rich floral and faunal diversity with scenic landscapes and water bodies, it has very good potential for development of eco-tourism. At present, the level of tourism is minimal. There are no stay facilities in Madei Wildlife Sanctuary. The sanctuary has some well-defined trekking routes that attracts the hard core trekkers and nature lovers. But owing to the lack of adequate facilities such as nature camps, resting places, trained guides etc, and the number of visitors has remained insignificant.

There is huge scope for ecotourism, which can provide livelihood opportunities to the locals stakeholders. The visitor's facilities should be well planned to prevent the biotic interference of the natural resources. The existing Eco Tourism activities are limited treks to Waterfalls viz Pale, Ladkyacho Vazar, Satrem, Javali, Nanorem, Ivrem; Nature trails cum Bird watching trails etc. Providing infrastructure, accommodation facilities etc.can help to boost ecotourism activities.

3.6.1.Existing ecotourism and interpretation zone

The Madei Wildlife sanctuary has been attracting visitors due to its landscape and numerous water cascades and water falls in monsoon some of this water falls are Perennial. The undulating terrain and elevated hill tops or Peak points have lot of eco-tourism potential, there is a small interpretation centre at the Sanctuary headquarter at Maloli and 14 marked nature trails in the sanctuary. The major tourist attraction in the sanctuary is the waterfalls, where tourists of ten visit. The details of existing nature trails are shown in table 8 and figure 12 below.

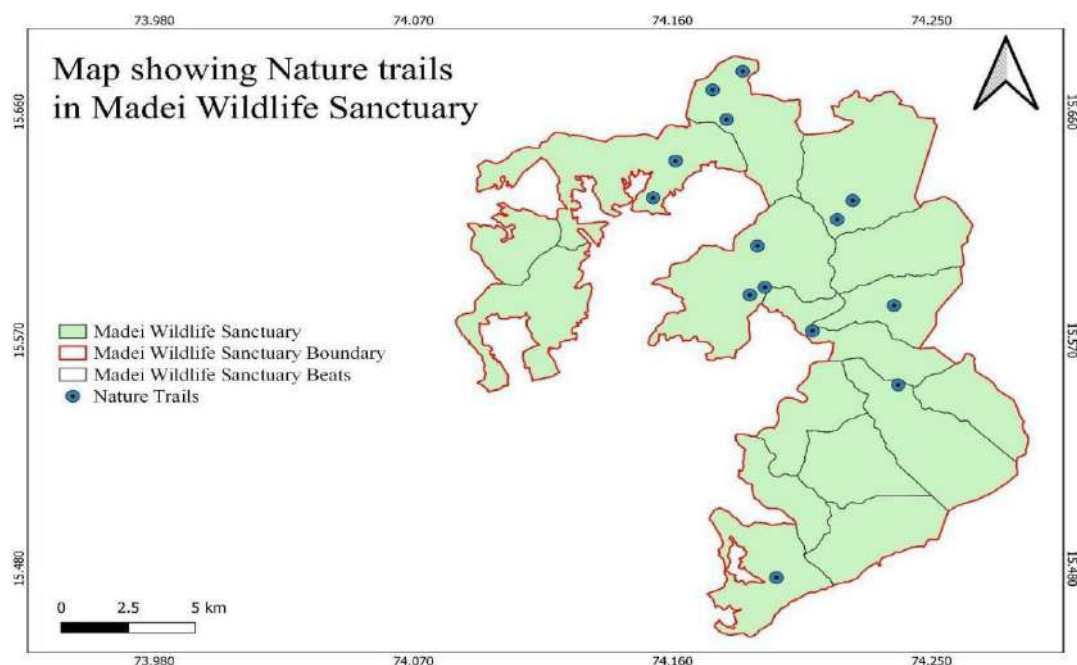


Figure12: Map showing the locations of Nature Trail in Madei Wildlife Sanctuary

Table No. 8: Details of Existing nature trails in the Madei Wildlife Sanctuary

Sr. No.	Locations	Approximate Length (km)
1	Pendral	02
2	Codal	02
3	Satrem (old bridge to mithachi mal)	02
4	Satrem (Satrem Village to Dhangarwada)	02
5	Nanoda	01
6	NIC to Chidambar road	0.5
7	Maloli Office to Check Dam	0.5
8	Vainguinim	04
9	Surla	01
10	Surla	02
11	Surla	03
12	Vainguinim (Golaulim to chorla)	04
13	Ivrem (Village to waterfall)	01
14	Ivrem (Ivrem to Golaulim)	02

Entry of visitors in sanctuary is permitted in above places and tourists are guided by private/local guides. Entry of visitors in sanctuary is permitted in above places daily from 7am to 5pm.

3.6.2. Last 10 years details of tourists, revenue generated

The footfall and revenue generated are given at **Annexure VII**.

3.6.3. Infrastructure related to tourism and visitor management

Though the sanctuary has potential to become a very attractive destination for nature enthusiasts and trekkers, interpretation facilities as well as camping facilities are highly insufficient. Even basic publicity facilities such as signages, brochures, pamphlets and web-sites are inadequate. As a result, the actual tourism potential of the sanctuary is not properly harnessed. Though the sanctuary offers excellent trekking routes, hardly any facility exists for the trekkers to give them a wholesome experience, such as well demarcated trekking paths, trained nature guides, camping facilities, nature interpretation facilities etc. However, very few private accommodations are available on the fringes of the sanctuary.

In the recent past, initiatives for capacity building of local youths as Nature Guides has been undertaken. Other Initiatives are also be taken by the Department for creation of eco-tourism sites at identified locations like Surla, Maloli, Pali and Caranzol and necessary action are being undertaken by involving local community. Recently the Standing Committee of National Board for Wildlife (NBWL) has approved the proposal of the State Government for developing Eco-tourism facilities at Surla by the Goa Forest Development Corporation subject to certain conditions.

3.7 Research, monitoring and training

3.7.1 Research and Monitoring

The Sanctuary is a natural abode of rich biodiversity. However, not much published data base is available on flora, fauna, and habitat use by animals, population dynamics and socio-economic aspects of the forest dependent communities. Research in Protected Areas involves controlled, empirical but systematic analysis of existing parameters and required managerial interventions. It involves tailored/ structured enquiry system to be carried out to elicit information for solving problems related to Sanctuary management. The need of research on PA's is inevitable. The Institutions like BNHS, SACON, WII, colleges, and universities in addition to NGO's are working in the field of conservation and carrying out several research activities. The Research and Utilization Division undertakes initiative in research and development programmes under Forest Department. There is a need for maintaining a close rapport with these scientific organizations for carrying out research activities on a regular basis for the better and effective management of Sanctuary landscapes. Research activities conducted in the Sanctuary are few. Wildlife Census was organized by the Forest Department in association with WII in 2014, 2018 and 2022. Preliminary studies have been conducted in respect of flora and some groups of vertebrates; they are not exhaustive.

Scientific information about wild animals, their habitat and various problems associated with the migration, diseases and the behavior of the animals has to be carried out as full-fledged research activity. Efforts to carryout research on habitat improvement, ecological studies, wildlife management, life history of individual species, breeding behavior of the small and larger animals need to be initiated.

3.7.2 Training of staff

There are two categories of training activities

1. Foresters, Forest Guards and Watchers working in field are given refresher training in wildlife management and legal aspects of law enforcement, periodically to update the amendment of law taken place in this regard.
2. Formal Training: The entire field staff are trained in training schools intensively and in addition, fire arms training, maintenance of fire arms and ammunition and its operations and martial art training are also given. These training's improve the field staff capacity in handling the situation during smuggling, control of poaching, fire combating and law enforcing.

Department also carries out training on regular basis and capacity building of forest frontline staff. The training imparted mainly focuses on for gaining the knowledge in latest wildlife management techniques, periodic survey and assessment of animal population, Camera Traps, M-Stripes patrolling apps, Wildlife Crime, FRA, Forest Fire management etc. The awareness generation programmes for the local community are also organized from time to time specially on subjects related to wildlife management including forest fire.

3.8. Wildlife Education / Interpretation

Nature trail education is conducted to students in different parts of the Sanctuary. The main objective of such trails is to create awareness among the young generation in conserving forests and wildlife. In addition to such trail, awareness programmes were also conducted for the people residing within the sanctuary limits as well as in the fringes, to inculcate interest in protecting forests and wildlife. Trained staff is involved in awareness programmes in schools situated in adjoining areas of the sanctuary.

3.8.1. Nature Education Camps

3.8.2. Nature camps & Infrastructure related to nature camps

Nature education camps of small duration are conducted as a part of Wildlife Week celebration. Nature camps are offered to various target groups especially for educational institutions / school children while paid nature camp facility can be offered to individual groups.

The infrastructure facilities for conducting nature camps are lacking in the Sanctuary compared to other sanctuaries/National Parks in the state and needs to be improved by providing a dormitory, tented accommodations, dining block, interpretation facilities and a good library. Each center should be equipped with accommodation for about 30 people, a kitchen and dining hall, an interpretation center, facilities for water recreation, etc.

3.9 Summary of Threats to Wildlife

The following threats are identified in the Sanctuary.

1. Destruction/Fragmentation of habitat
2. Illegal felling of trees & small timber.
3. Cultivation within the Sanctuary by sanad holders / leasee / Private Estates
4. Domestic livestock grazing
5. Forest Fire
6. Poaching
7. Man-animal conflict
8. Exotic and Invasive weeds
9. Possession of arms by the agriculturists. `
10. Soil Erosion
11. Imminent flowering of bamboo
12. Trespassing into the Sanctuary.
13. Drying up of streams and waterbeds in summer
14. Disease and pests

CHAPTER4

THE PROTECTED AREA AND THE INTERFACE LANDUSE SITUATION

4.1 The existing situation in the Zone of Influence(ZI)

4.1.1 Settlements within the Madei wildlife Sanctuary, number of families and details of land in possession.

The extent of Madei Wildlife Sanctuary is 208.48 Sq.km., There are many villages inside the boundary of Madei Wildlife Sanctuary situated on the Northern & Eastern part in Belgaum district in Karnataka, Southern part, and western part of Sanctuary in Sattari taluka of Goa. The major portion of sanctuary has been notified under Section 18 of the Wildlife Protection Act 1972 and settlement of rights and claims as per act is yet to be completed. Further, settlement of more than 1600 claims under the Forest Rights Act, 2006 is under process. The human habitations in and around the wildlife sanctuary and is one of the most important challenges for wildlife management.

4.2 Name of Revenue Villages, Human habitation & Livestock populations

The villages that are situated within the sanctuary are moderately populated. Moreover, the houses are well dispersed and the villages are not congested. The cattle population is also comparatively less in these villages. List of villages situated within the sanctuary with their human and cattle population details is given in **Annexure – XXII**.

4.3 Main profession/occupation & Land use

Madei can be considered as the land of plantation crops cultivated extensively major commercial plantation crops that are grown include Cashew, Arecanut, pepper, Banana, Sugarcane etc. Because of the private plantations that have substantial tree growth, the dependence of people on the Government forests are comparatively less. Apart from maintaining and managing commercial plantations, other livelihood of the villagers include agriculture, Government service, working as labor in farms, and dairy activities etc. There are altogether 31 villages abutting the sanctuary. The negative impacts like crop raiding and loss of property due to straying of wild animals from the sanctuary are reported occasionally in these surrounding villages. Traditionally the fringe residents are conservation oriented and therefore extent of alienation is not very significant.

Villages inside and outside the Sanctuary: Ethnic identities, traditions, customs, relationships between different groups of people, relationship with forests:

Traditionally the people of Madei have lived in close association with nature. Many of the families have private land holding having substantial tree growth. The farms are maintained for growing Cashew, pepper, Arecanut, Banana, Paddy, Hill millets etc. People meet their requirements of firewood, etc from the forests. Agriculture is done on the swampy plain areas which must have been cleared long back. Paddy is grown in these valleys mostly for self-consumption rather than any commercial purpose. In areas where traditional food crops are grown or where the communities are not engaged in land-based activities, people's dependence on forest is more. To certain extent, some of the demands of the people are also met from the adjoining non forest government lands. One of the important local demands is of small timber for house construction and manufacture of agricultural implements like plough, harrow, yoke etc.

CHAPTER 4 – THE PROTECTED AREA AND THE INTERFACE LANDUSE SITUATION

The villages have a mixed ethnic composition having representation of Gaonkars, Brahmins, Gauda, as well as Scheduled castes (Mahar, Chambar) and Scheduled tribes (Gauda, Velip). The Gaonkars and Gauda are the original inhabitants and their language is known as “Konkani”, It is the most influential language and does not have a definite script. The traditional festivals of Gaonkars are associated with agriculture or nature worship by the people. Major Festivities include Shigmo, Ganesh Chaturthi, Jagor etc. Festivals observed in other parts of the state are also observed within the sanctuary also.

4.4. Anthropogenic pressures

- (a) Fuel wood collection-one of the major dependencies of the local population on sanctuary forests is for the collection of fuel wood for domestic use.
- (b) Livestock grazing and fodder collections - The communities living in the sanctuary, practice animal husbandry on a smaller scale mainly for survival. The livestock mainly comprises the cattle and goats and few buffaloes, which for ages in the sanctuary.
- (c) NWFP collection: Collection of wild fruits for rituals (matoli during Ganesh chaturthi), *Emblica officinalis* (Amla) and *Carisa carandus* (Caranda) and *Artocarpus lakucha* (Otumb), bark of *Careya arborea* (Kumbo) and *Kedia calacina* (Kevan), wild edible Mushroom (alambi), tender bamboo shoots (Keel), fresh water fishes, crabs for domestic use is prominent.

4.5. STATE OF ECONOMY:

Almost the entire population in and around Madei Wildlife Sanctuary is based on the farm sector. There are no established big, small or home industries. 80% of the population consists of small and marginal farmers. The population is also dependent on Cashew plantations. The proportion of work force to the total population is as high as 55%. Seldom people have disposable surplus income. Every family has a first preference to grow food grains for home consumption. Quite a few families have abandoned growing of food grains, as it

is uneconomical but lease out the lands.

However, garden lands are looked after well irrespective of the returns. Economic slump laid off a large part of agriculture labour force and therefore some of the male members migrate to nearby towns for employment. But their number is small. The adverse effect of general economic situation is not harsh on the local people mainly because of stable monsoons and production of basic minimum food grains by each household. Traditional occupations such as carpentry, black smith, fishing, weaving, handicrafts etc., are also very uncommon in the area. The educated people prefer to do white or blue collared jobs or petty business instead of agriculture. Leisure time is utilized for gathering non-forest products, pasturing cattle, etc. If the people are purged from using the forests directly or indirectly, living becomes difficult.

4.5.1 Vocation:

The vocation of people living in and around the Sanctuary is agriculture, plantation, animal husbandry and forest-based cottage industry like basket making and carpentry. Jobs are very few except in large coffee estates, local banks, hospitals, schools etc. In the coffee estates in addition to permanent labor, a lot of floating labors are utilized during the coffee picking season in December-January.

4.5.2 Use of forest and non-forest-based resources:

Traditionally, local economy is dependent on Forest resources. Earlier, before the ban was brought on tree felling, the local economy was heavily dependent on the forest. But with the stoppage of felling poor families depend on sale of firewood illegally collected, for earning their livelihood and also for domestic use. Likewise, with no grazing grounds for the villagers, the Sanctuary is depended upon for gazing during the crop season i.e., June to December. The villagers, are also dependent on the Sanctuary for their requirement of fuelwood, bamboo and small timber though illegally.

4.6 Implication of the land use resource dependency for the conservation of PA

Due to large number of human habitations in the sanctuary, movement of people and vehicle is almost in all accessible parts of the sanctuary, anthropogenic factors are one of the major challenge for scientific management of an wildlife sanctuary. With the people living around the Sanctuary having low subsistence level of economy, they illegally fell trees, remove fuel - wood, bamboo and small timber, graze cattle inside the Sanctuary and attempt at encroachment within the Sanctuary. This exerts tremendous pressure. Small timber, bamboo and firewood is removed illegally both for their personal requirement as well as for sale. This has degraded the habitat. Illicit grazing also reduces palatable fodder for Wildlife in addition to spreading diseases. Cattle herders, burn the forest floor for obtaining fresh flush of grass and in the process extensive area is burnt degrading the habitat.

Man-animal conflict is thus increasing. Though, Cattle proof trench has been dug at several places around the Sanctuary to keep the Wild animals from moving out of the Sanctuary and damaging crops, the trench is invariably filled up at various places especially near villages, to facilitate movement of cattle and villagers into the Sanctuary for illegal grazing and fuelwood collection etc. In turn, Wild animals also move out and damage fields and property.

II – PROPOSED MANAGEMENT

CHAPTER 5 - VISION, OBJECTIVES, ISSUES & PROBLEMS

5.1 Vision Statement

In – situ protection, conservation, and scientific management of Madei Wildlife Sanctuary with people's participation.

5.2 Objectives of Management

The objectives of Management Plan for Ten (10) year period i.e. 2024-25 to 2033-34 are as under:

1. Protection and Conservation
2. Integrated Development of Wildlife Habitat including Bio-Diversity enrichment plantations, aided natural regeneration, soil and moisture conservations works etc.
3. Forest fire prevention, and mitigation measures
4. Measures to check and minimize man-animal conflict
5. Eco-Tourism with people's participation
6. Green job opportunities to local communities
7. Research work, including documentation of base line data
8. Training and capacity building of forest frontline staff and local communities
9. Extension activities including seminars, workshops, nature camps etc. for awareness generation among masses especially children

5.3 Problem in achieving objectives

S.No.	Objectives	Challenges
1.	Protection and Conservation	1. Inaccessible terrain and topography 2. Poor communication network 3. Creation and maintenance of infrastructure 4. Anthropogenic pressure 5. Habitat fragmentation (Human habitation and Public amenities etc.) 6 Monitoring of wildlife in remote areas 7 Maintaining adequate prey predator base 8 Conserving and enriching biodiversity of the landscape 9 Traffic especially during night 10 Fuel and fire wood collection 11 Inadequate executive field staff 12 Wildlife disease/ Inadequate forensic /veterinary facilities
2.	Integrated Development of Wildlife Habitat including Bio-Diversity enrichment plantations, aided natural regeneration, soil and moisture conservations works etc.	1. Inaccessible areas, terrain and topography 2. Excessive rainfall and soil erosion 3. Invasion of weeds 4. Monoculture plantations 5. Creation and maintenance of plantations 6. Grassland management 7. Anthropogenic pressure 8. Grazing 9. Littering and dumping of non-degradable waste

3.	Forest fire prevention and mitigation measures	1. Inaccessible terrain and topography 2. Fires reported sometimes in remote areas 3. Mobilization of man power and forest fire mitigation resources especially in remote fire affected areas. 4. Anthropogenic pressure. 5. Fuel load on forest floor in deciduous forest patches 6. Equipment availability and deployment 7. Effective and timely communication
4.	Measures to check and minimize man-animal conflict	1. Anthropogenic pressure 2. Straying of wild animals near human habitations 3. Cattle and grazing pressure 4. Human habitations in and around wildlife sanctuary 5. Settlement of rights and claims 6. Lack of awareness 7. Non-availability of baseline data of Prey base
5.	Eco-Tourism with people's participation	1. Inaccessible terrain and topography 2. Inadequate eco-tourism infrastructure 3. Capacity building and training of forest frontline staff and local communities 4. Development of eco-tourism facilities(non-permanent) in remote locations with basic amenities
6.	Green job opportunities to	1. Development of eco-tourism facilities in remote areas

	local communities	2. Trained manpower 3. Unexplored eco-tourism opportunities
7.	Research work, including documentation of base line data	1. Inaccessible terrain and topography 2. Inadequate information about floral and faunal species richness and diversity 3. Research volunteers to take up work in the remote areas 4. Budgetary allocation 5. Trained manpower to take up and monitor research works 6. Insufficient information / research on threatened category of flora and fauna.
8.	Training and capacity building of forest frontline staff and local communities	1. Comprehensive training and capacity building guidelines at Department level 2. Inadequate trainers in the Department 3. Multi-tasking responsibilities Only one training institute in the Department
9.	Extension activities including seminars, workshops, nature camps etc. for awareness generation among masses especially children	1. Inaccessible terrain and topography 2. Budgetary allocation 3. Willing target participants 4. Inadequate Nature information Centre 5. Inadequate infrastructure like Conference Hall, Amphitheatre for extension activities

Chapter 6

Strategies

6.1 Boundaries

6.1.1: Legal Boundaries:

As per the notification, the Madei Wildlife Sanctuary boundary mainly follows the ridges and the description is as follows, Madei Wildlife Sanctuary comprises of 208.48 sq km comprising of only one Wildlife Range. The final boundary demarcation is yet to be firmed up and finalized. The Department should undertake demarcation of boundary of the sanctuary under applicable Act after due settlement of rights and claims of eligible beneficiaries expeditiously after completion of necessary procedure under Wildlife (Protection) Act, 1972.

Boundaries	1.Notification No.2-333-99-FD/A-Part/940 (Area: 44.27 sq. kms.) Boundaries:~ Eastern boundary State boundary of Goa; Northern boundary State boundary of Goa; Southern boundary - Northern boundary of Bhagwan Mahaveer Wildlife Sanctuary and southern border of Assodem; Western boundary - The western boundaries of Assodem and
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	Dongurli. 2. Notification No 2-333-99-FD/A-Part/941(Area: 164.21 sq. kms.) Boundaries- Eastern Boundary Runs along the eastern boundary of villages Satrem and Derodem along the Goa-Karnataka border and 'then along the' northern boundary of Vainginim and western boundary of Zarani and then along the south-western boundary of Codval upto the Goa Karnataka border then going along and meeting the northern border of Bhagwan Mahaveer Wildlife Sanctuary. Northern boundary - Runs along the northern boundary of village Satrem along the Goa-Karnataka border then along the western and southern boundary of Surla and then along the eastern boundary of Golauli to touch the Goa-Karnataka border and then runs along the State boundary of Goa upto Kelaudem. Southern boundary - The northern boundary of Bhagwan Mahaveer Wildlife Sanctuary and the southern boundary of Govane. Western boundary - Runs along the western boundaries of the following villages in a south to north direction - Gavane, Sirsode, Siranguli, Caranzol, then along the banks of the Mahadayi river upto the western boundary of Carambolim Brama, Xelopo-Buzzuroco, Sigonem, Codal, and then going along the southern boundaries of villages Golauli, Ivre-curdo, Ivre-buzurroco, Choraundem and then going along the eastern boundary of Pale,
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	Compordem and then goes along the western boundary of Compordem, southern and eastern boundary of Zorme and then eastern, southern and western boundary of Dabem along the Western boundary of Zorme and western and northern boundary of Gullulem. Then joining the western boundary of Charaundem and going along the southern boundary of Kelaudemupto the State border of Goa.
Constitution	This PA was established in 1999 to protect adequate ecological, faunal, floral, geomorphological. natural or zoological significance for the purpose of protecting, propagating, or developing wildlife or its environment (hereinafter called the "said area").

6.2 ZONATION AND THEME PLANS IN MADEI WILDLIFE SANCTUARY:

This is the first management plan of the Madei Wildlife Sanctuary, the Protected area is proposed to be divided into various zones to provide a geographical framework for scientific management, indicate management priorities in different parts of the sanctuary, indicate the types and levels of use appropriate throughout the sanctuary, assist in minimizing existing and potential conflicts between uses and activities and the protection of sanctuary values and to provide a basis for assessing the suitability of future activities and development proposals. To achieve the objective, the Wildlife Sanctuary and its adjoining areas proposed to be managed as the following zones:

1. Conservation zone
2. Buffer zone
3. Eco -Tourism zone & Eco-Development zone

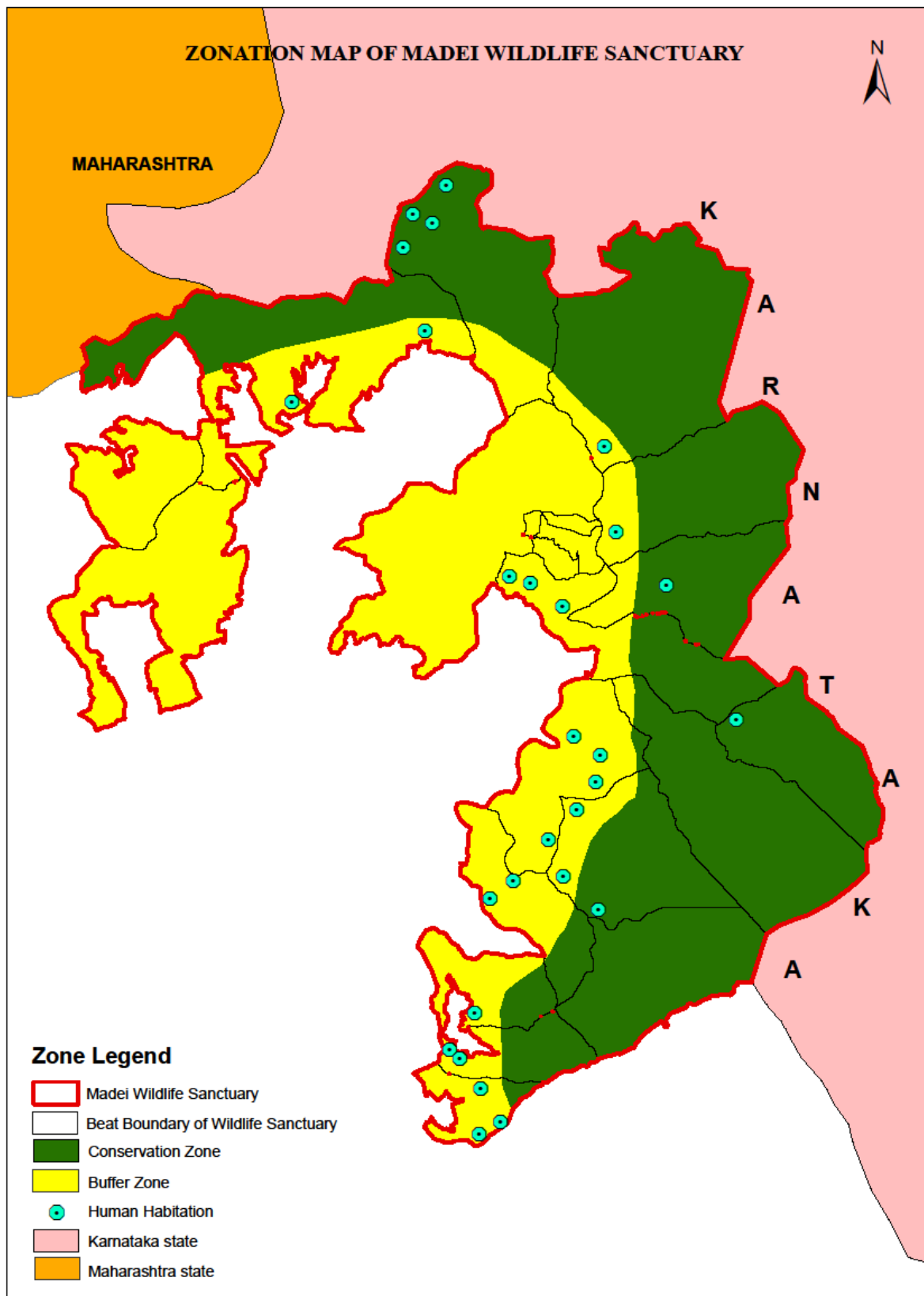


Figure no. 13: ZONATION AND ZONE PLANS IN MADEI WILDLFIE SANCTUARY

6.3 ZONE PLANS

6.3.1 CONSERVATION ZONE:

The following objectives and strategies have been formulated for the Conservation zone.

1. To give top priority to protection, conservation and preservation of species in their natural habitat. Natural course of ecological succession is to be promoted.
2. To allow minimal external influences and undertake such habitat management interventions that are essential.
3. To undertake need based habitat restoration activities such as soil and moisture conservation activities in the areas prone to degradation.
4. To undertake Eco-tourism activities in the areas within Conservation zone, having high Eco-tourism Potential.

6.3.2 BUFFER ZONE:

Buffer zone can be defined as the zone that acts as a cushion to absorb all the shocks of biotic impacts and does not let them affect the Conservation zone. The Buffer Zone allows development in balance with the principles of conservation. This zone permits human centric activities with precaution, activities like ecotourism are encouraged here.

The following objectives and strategies have been formulated for the buffer zone.

1. To undertake activities for awareness generation in the local people to sensitize them towards nature, wildlife, and the importance of conserving the sanctuary area
2. To provide extended buffering for Wildlife and social buffering for people

3. To encourage eco-tourism related activities to generate local employment and a sense of belongingness towards the sanctuary.
4. To provide employment to the villagers who depend on forestry activities for their livelihood.
5. To undertake eco-development activities to reduce the dependence of people on forest resources to improve their economic status so as to garner more local support for the sanctuary.

6.3.3 ECO TOURISM ZONE:

The Eco - tourism zone overlaps with the buffer zone, consists of the areas where eco-tourism is allowed to a certain extent without disturbing the natural integrity of the ecosystem.

The eco-tourism zone will be managed with focus on visitor management; nature-based regulated ecotourism programmes and promote environmental conservation awareness. All the activities in this zone shall be implemented as prescribed in the Chapter 7

The following objectives and strategies have been proposed exclusively for the Eco - Tourism zone

1. To create or improve Eco- tourism facilities in such a manner that there is no adverse impact on the sanctuary, either by the Forest Department or through Goa Forest Development Corporation.
2. To provide maximum satisfaction to the visitors besides creating nature awareness and conservation.

6.4 Theme Plan

6.4.1. Theme Plan for Protection and Conservation

6.4.1.1. Administrative Units (Division, Range, Forest Station, Section/Outposts)

The Chief Wildlife Warden (CWLW) will be responsible for over all control of the sanctuary. Deputy Conservator of Forests (Wildlife), ACF and RFO will be responsible to implement the management plan. The entire Sanctuary is under one Range of Wildlife & Eco-Tourism (North) Division with Three Rounds and 16 Beats. Considering its large jurisdictional area, the existing administrative & functional units may be reviewed and after careful consideration new Rounds/Beats may be added/altered/modified or merged for better scientific management of the sanctuary with the approval of the competent authority.

6.4.1.2. Protection/Patrolling/Anti-Poaching Camp/Outpost Stations

There are at present 04 existing protection camps in Madei Wildlife Sanctuary at Surla, Vagheri, Assodem and Galauli. To further augment the efficiency of protection / patrolling / anti poaching, the network of protection camps all across the Sanctuary may be strengthened by putting up additional outposts at all strategic locations. This will help to pre-empt the possible wildlife offence at source and in transit. All the camps should have basic amenities, required equipment and gadgets to attend possible cases of forests and wildlife offence in a professional manner on real time basis.

6.4.1.3. Patrolling

Patrolling constitutes one of the most effective measures to keep vigil, check and prevent all attempts of forest and wildlife related offence within the Sanctuary. The Madei Wildlife Sanctuary is divided into sixteen functional

Beats. The concerned forest front-line staff should carry out regular patrolling within their respective jurisdictions and should record, in detail, their observations in the daily diaries to their respective controlling officers. Apart from this, patrolling should also be carried out by vehicles by augmenting to cover the entire Sanctuary including remote areas.

For this purpose, Department should ensure sufficient number of wireless-fitted two wheel and 4 X 4-wheel vehicles at range and Beat level.

6.4.1.4 Providing adequate staff:

Though the requirement of staff is dealt in a separate Chapter, it is very necessary to see that all the anti-poaching camps are manned with enough Forest Guards and watchers. At present number of permanent staff is not adequate and therefore several camps are deficient in personnel. In some cases, camps are manned by temporary workers for want of permanent field staff. Considerable number of vacancies exist in the sanctuary as the present staff strength is far below the required sanctioned strength. Besides the quality of staff is also a critical issue. The strenuous nature of work and various challenges such as living in adverse situations, risk from encounter with wild animals, need to walk on difficult terrain necessitate that the camps are manned with quality staff. It is desirable that the field staff deployed for protection work in the sanctuary must be young, energetic, and courageous and conservation oriented. It is also desirable that field staffs are properly trained in handling arms and wildlife management. Incentives and rewards should be given, commensurate with cases detected etc.

Following steps are proposed to improve the staffing pattern:

1. Filling up the vacancies of field staffs in regular periodicity.
2. Deployment of relatively young staff.
3. Regular training of field staff for capacity building in modern combat, intelligence gathering etc. Training is also necessary to make them fit for regular arduous work.
4. To re-in force the existing camps with sufficient number of staff by providing rotational camping duty for all staff posted in the Division to strength in protection mechanism.

6.4.1.5 Inter-Division and Inter-State Co-ordination

Madei Wildlife Sanctuary, borders with Bhagwan Mahavir Wildlife Sanctuary in South and North Goa Forest Division in west. For better and effective management and to exchange information, inter-division meeting should be organized on a regular basis and joint patrolling should also be carried out frequently. Accordingly, a report should be submitted to the Chief Wildlife Warden. Further, an institutional framework for inter-State co-ordination also need to be established with the bordering Karnataka and Maharashtra States to exchange required inputs including intelligence, wildlife management and forest fires, etc.

6.4.1.6 Roads & Trek paths

All the forest routes, trekking routes should be maintained on regular basis. Any new road, if at all required, should be constructed as per the applicable Law. The State Highway 31 Sanquelim-Belgavi passes through the Sanctuary. Therefore, speed regulation may be enforced effectively and extra vigil may also be ensured especially during the night hours. Adequate signages all along the road should also be placed for information and compliance by one and all. The

Gululem check post exists on State highway. It should be maintained with all basic amenities and required infrastructure, including wireless communication network, etc. Possibility of creating underpasses on State Highway for facilitating movement of wild animals and canopy bridge for arboreal animals be assessed and established in consultation with Line Departments. The road and trek paths details are given in **Annexure – XXIV**.

6.4.1.7 View line Clearance

Clearance of the under growth vegetation upto 25 mtr. on either side along main forest roads, and up to two to three mtrs on either side along nature trails / trek routes within the Sanctuary may be carried out for better visibility and to ensure safety of commuters and wild animals.

6.4.1.8 Vehicles

Adequate number of two wheel and four-wheel vehicles may be ensured for effective and efficient management of various works within the Sanctuary. Specially designed operational vehicles like fire tenders should also be provided to attend forest fire cases on real time basis. Water tankers may also be provided as per requirements. Since the terrain is highly undulating and mostly hilly, preferably 4 x 4 vehicles may be made available for effective use and efficient surveillance of the Sanctuary.

6.4.1.9 Communication

Substantial stretch of Madei Wildlife Sanctuary is hilly, undulating and remote; Communication has been one of the major challenges in scientific management of the landscape. To ensure better connectivity for efficient management, a self-reliant wireless communication network system with required number of repeaters, fixed and mobile stations is an imminent requirement. Adequate number of handsets may be provided to all the forest

frontline staff for better connectivity and exchange of real time information. This will facilitate attending protection related works, including forest fires on real time basis. The support of other concerned line Departments like Police, Fire and Emergency Services Departments may also be taken as and when required.

6.4.1.10 Arms & Ammunition

Easy gains from illicit felling and poaching of wild animals in past in other parts of the country have led to the lucrative market. Offenders tempt to get profit from this illegal business. In the light of prevailing situations, it is imperative on the part of management to review the requirement of arms and ammunition and based on the assessment, requisite numbers of arms and ammunition may be made available to the executive officers / staff for effective management of the Sanctuary by ensuring adequate safe house arrangements at Range level.

6.4.1.11 Staff Welfare

By virtue of the mandate of the Department, the forest frontline staff carries out various types of works including protection, plantation, construction, wildlife monitoring, soil and moisture conservation works, survey and demarcation, eco -tourism, research and training, extension activities like nature camps, workshops seminars, etc. Further, the work over a period of time has increased many fold, whereas staff strength remains the same. To ensure that the concerned forest staff carries out the assigned duty effectively and efficiently in a professional manner, the Department should ensure that basic amenities like residential quarters, insurance, safety are provided to all the staff. Many of the works involve risk; therefore, options for adequate insurance cover may also be worked out preferably as a part of CSR activity or in collaboration with the bank. Regular medical camps may also be organized for the staff.

6.4.1.12 Training and Capacity building

The management aspects related to forest and wildlife are changing frequently with technological advancement and improvised silvicultural and wildlife management practices. Regular training and capacity building of the forest frontline staff should be carried out at regular intervals. Specially designed courses may also be conducted for identified specialized areas like, forest fire management, wildlife monitoring, forensic science, etc. Exposure visits may also be organized for the frontline staff to enrich them sufficiently and draw benefits from success studies in other parts of the country. Identified interested staff may be sent to specialized training Institutions like, Forest Survey of India and Wildlife Institute of India, Dehradun for long term training. This will ensure availability of trained man power within the Department to take up such specialized works. Annual training calendar may be made with the approval of Chief Wildlife Warden by provision sufficient fund.

6.4.1.13 Wildlife disease and wild animal death guidelines to the wildlife managers

Death of scheduled animal and Post - mortem of all the wild animals including diseased ones should be carried out strictly as per applicable Standard Operating Procedures (SOP) approved by the Competent Authority. Proper record should be maintained at the Division level and a report in prescribed format should be submitted to the Chief Wildlife Warden as per time line prescribed in SOP. The required equipment and veterinary kits should be provided to the frontline staff. One Veterinary Officer and one Veterinary Assistant may also be employed at the Divisional level.

6.4.2 Theme plan for Integrated Development of Wildlife Habitat including Bio-Diversity enrichment plantations, aided natural regeneration, soil and moisture conservation works etc.

6.4.2.1 Biodiversity Enrichment Plantation:

Goa is situated in Western Ghats which is one of the three Biodiversity hotspots in the country. To further enhance the species richness and diversity a holistic and comprehensive biodiversity enrichment efforts should be taken by the Department by including following points

1. Plantation of indigenous species of trees, shrubs and grasses.
2. Quality Planting Material (QPM) with high endurance should be raised in the Department nursery by identifying and collecting propagules from plus trees from forest area.
3. Modern nurseries with all required equipment's should be setup to raise QPM.
4. Healthy Tall saplings minimum 5 feet in good health and high endurance should only be planted to ensure better survival rate.
5. As per requirements appropriate fencing should be carried out to protect the plant from grazing etc.
6. To ensure availability of the food for wildlife within the sanctuary fruit bearing tree species should be given preference.
7. In inaccessible and remote areas plantations measures like seedballs, arial seeding etc. should also be attempted.
8. Maintenance of the Biodiversity enrichment plantations should be carried out for at least 07 years to ensure that the plantations is well established. Department may prepare model estimates for the guidance and reference of the Forest frontline staff.
9. In each plantations sites plantation layout plan including details of species planted and source of funds should be placed.
10. Plantations should be 100% inspected at the level of Forest Guard and Round Forester and Range Forest Officer. ACF and Dy. Conservator of

Forests should also inspect at least 50% and 25 % of plantations.

11. Plantations Journals as per the guidelines in prescribed format should be prepared and maintained for the entire period of 08 years. After 08 years all plantations' Journals will be deposited with the Divisional offices for records and reference.
12. To identify suitable species with reference to management of a particular faunal species, Department may also work in coordination with research organisations and institutions.

Table No. 9 Indicative list of preferred plants species to wild animals in Madei Wildlife Sanctuary.

S.No	Animal	Species
1	Gaur	<i>Adina cordifolia</i> , <i>Desmodium triflorum</i> , <i>Strobilanthes callosus</i> , <i>Grewia sp</i> , <i>Helicteres</i> and <i>Vitex negundo</i>
2	Spotted deer	<i>Ficus</i> species, <i>Cordiamyxa</i> grasses
3	Hanuman Langur-	<i>Acacia indica</i> , <i>Ficus racemosa</i> , <i>Ficus bengalensis</i> , <i>Diospyros melanoxylon</i> , <i>Ficus religiosa</i> , <i>Madhuca longifolia</i> , <i>Mangifera indica</i> , <i>Syzygium cuminii</i> , <i>Tamarindus indica</i> , <i>Aegle marmelos</i> , <i>Holoptelia integrifolia</i> , <i>Lannaea coromandelica</i> , <i>Terminalia arjuna</i> , <i>Ziziphus</i> , <i>Carissa caranda</i> , <i>Pithecellobium dulce</i> , <i>Albizzia procera</i> , <i>Grewia sp</i> , <i>Bombax ceiba</i> , <i>Abrus precatorius</i>
4	Bonnet Macaque	<i>Mango</i> , <i>wild figs</i> , <i>tamarind</i> , <i>neem</i> , <i>gulmohar</i> , and <i>pongamia</i> , <i>Caryota urens</i> ,

		<i>Syzygium cumini</i> , <i>Ficus religiosa</i> , <i>Mimosa pudica</i> , <i>Bambusa sp</i> , <i>Ficus sp</i> , <i>Strychnos nux-vomica</i> , <i>Terminalia spp</i> , <i>Artocarpos heterophyllus</i> , <i>Areca catechu</i> .
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6.4.2.2 Aided Natural Regeneration (ANR):

1. In moderately dense forest and in dense forest gap plantations through ANR may be taken up for further enhance the quality of the vegetation to very dense category and for Biomass re-generation.
2. Suitable indigenous species should only be planted.
3. Healthy tall saplings minimum 5 feet in good health and high endurance should only be planted to ensure better survival rate.
4. Fruit bearing tree species should be preferred.
5. In sites with grazing pressure appropriate measures may be taken to safeguard the saplings brushwood fencing by using locally available material may be considered.
6. ANR plantations should be maintained for at least 04 years.
7. Plantations journals as per the guidelines in prescribed format should be prepared and maintained for the entire period of 04 years. After 04 years all plantation journals will be deposited with the Divisional offices for records and reference.

6.4.2.3 Soil and Moisture Conservation:

1. To check soil erosion and to facilitate for ground water recharging. Both vegetative and engineering measures should be taken for soil and moisture conservation.
2. The engineering measures like construction of check-dams, grade stabilizers, Gabbions, Loose Boulder Check-Dams, Earthen bunds, gully plugging, retaining walls etc. may be taken up after careful selection of

the site considering water shed approach.

3. Vegetative measures like plantations of Bamboo, Cane, Grasses and other suitable soil binding species may be taken up at all soil erosion vulnerable sites.
4. Nursery of quality planting material for SMC works should be one of the focus of the Department and adequate number of saplings should be planned.
5. The de-siltation of the SMC structure's like check-dams etc. should also be carried out from time to time as per requirements.

6.4.2.4 Weed management:

1. The weeds posing threats to Wildlife habitat is *Eupatorium* sp., which is common invasive species in the Sanctuary area. Weed infestation in natural forests suppresses natural regeneration and grass growth leading to deterioration of the habitat quality. The details of problem areas with respect to weed are detailed in table 7. *Eupatorium* (*Chromolaena odorata* (L.) King and Robinson) is a light demander and hence infest the open area faster, it is also abnoxious weed generally confined to forest edges and clearings, infestations can lead to changes in the structure and composition of native plant communities, tree clearing for agriculture and other development appears to facilitate spread of the plant, which is quick to colonies road sides, forest edges, plantations, and pastures. Weed eradication is attempted in many areas but the results are less effective.
2. Following measures are suggested to check proliferation of weed to encourage natural regeneration of indigenous species:
 - a. To check natural competition to promote growth of indigenous species Department should plan a comprehensive long-term Weed Management Plan.
 - b. Removal of Weed should be carried out as per SOPs prescribed.
 - c. The area where the Weeds have been removed should be immediately take up with suitable plantations. In case there already exists natural

regeneration, the plantation may not be required.

- d. Eupatorium is the most common invasive species in the sanctuary it should be the priority to check further proliferation and spread in new areas.
- e. The removal of Weed should be taken up before flowering.
- f. Weed removal in a particular area should be carried out for 03 consecutive years. So that the remains of the shoots arising out of root are removed. This experiment has been done in other parts of the country also. Department may like to study and suitably amend and apply in case of Madei Wildlife Sanctuary.

6.4.2.5 Salt licks:

Following measures is suggested:

1. Salt licks are required in the forests to supply required minerals and salts to the wildlife specially Herbivores.
2. Salt licks should be placed at all suitable locations like near waterholes etc. to cover the entire sanctuary area.

6.4.2.6 Water holes:

Following measures are suggested to ensure availability of water throughout the year in all parts of sanctuary:

1. To ensure availability of water to the wildlife during all seasons especially summer water holes should be created/ maintained at suitable locations considering water shed approach.
2. Waterholes should be eco-friendly in nature and should camouflage well with the surrounding environment. Bare minimum use of cement concrete should be ensured.
3. To cover the entire sanctuary a comprehensive plan for creation of waterholes should be prepared by the Department.
4. Desilting of existing waterholes should be carried out on regular basis

specially before monsoon.

5. Digital Mapping of all the waterholes within the sanctuary should be carried out for reference and records.

6.4.2.7 Grass land Management:

Measures suggested for grassland management area as under:

1. Grasslands are one of the important landscapes especially for herbivores and big cats.
2. At suitable locations grasslands may be created and the existing grasslands should be improved in terms of palatable grasses.
3. Monoculture plantations shall be converted into grass lands pastures to increase food availability for herbivores.

6.4.2.8 Eco-restoration of Plantation areas:

Within the sanctuary there are several plantations of Acacia, Eucalyptus, and Cashew. List of Acacia plantations in the sanctuary is enclosed as **Annexure XXVII**.

In order to arrange availability of food for the wild animals, habitat improvement measures like taking up Plantation of wild fruit bearing trees and development of grass land in gap areas of existing plantations, wherever possible, will be undertaken.

6.4.3 Theme plan for forest fire prevention and mitigation:

6.4.3.1 Engagement of fire watchers:

For monitoring and containment of forest fire during fire season, fire watchers should be engaged between December to May across state, local youth may be deployed for this purpose by imparting basic training along with other staff. Fire prone areas may be identified and watcher may be deployed at strategic places to

monitor incidence of fire and to inform forest frontline line of respective area on real time basis, so as to control / douse fire in shortest feasible time.

6.4.3.2 Creation of fire line:

Fire lines may be created across risky / identified areas by making a buffer by removing dry combustible material in a width of minimum 2 mtrs across forest floor to break continuity of fire creeping on forest floor.

6.4.3.3 Control burning:

Dry biomass on forest floor is medium for forest fire spread, so as to prevent fire, control burning activities should be taken up at identified places in forest, along either side of roads and linear ways by gathering and burning dry leaf litters and dry biomass, it is one of most effective ways to reduce fuel load in a controlled environment.

6.4.3.4 Infrastructure:

Considering forest fire risk involved, assessment of firefighting equipment should be carried out at regular interval as per requirement and required number of such equipment and tools should be included in annual plan. All the field divisions should be equipped with firefighting tools and machinery like mechanized air blowers, mist blowers, rakes and firefighting aprons and other field infrastructures like protection camps, watch towers. Specially designed water tankers suited for undulating forest terrain may be provided to division.

6.4.3.5 Trainings and awareness programmes:

All the frontline staff and villagers across sensitive areas should be trained periodically to combat forest fire. Emphasis will be given on joint training of all stakeholders. Special training and awareness camps will be organised for the local community. Forest fire simulation exercise may be also conducted from time to time. Further, awareness workshop and programmes may be conducted for

stakeholders to sensitize about preventive measures to control fire including cause and ill effects of forest fire.

6.4.3.6 SOP dry biomass management:

The slash burning in farm and agriculture land, which is seen as one of the main sources for fire in forest area, should be regulated. An SOP may be attempted by Agriculture Department in coordination with all concerned line departments. Roads passing through Sanctuary is vulnerable for fire set in by commuters, dry biomass management by PWD in Right of Way (ROW) shall be ensured by forest department by giving required clearances before onset of fire season.

6.4.3.7 Restoration and Rejuvenation of affected area:

In all fire affected areas, mostly ground vegetation is affected which may retrograde the forest regeneration. Assisted Natural Regeneration (ANR) plantation should be taken in entire affected area to ensure early restoration of affected area. Plantations will be taken up considering Important Value Index (IVI index) of the existing forest which would help in creating a resilience to the forest. The plantation area may be fenced as per site requirement and should be closely monitored for better survival.

6.4.3.8 Upgrading the Approach:

Forest fire risk may be assessed on periodical basis in consultation with all the stakeholders and considering all factors existing policy and administrative interventions may be revisited, revised, revamped, and updated to address the future challenges from forest fires occurring in the sanctuary.

6.4.4 Theme plan to check and minimize man-animal conflict

1. To address the issue Department should ensure availability of food and water for the animals including Avifauna in the forest area. Suitable fruit

bearing tree species and palatable grasses should be planted in all parts of the wildlife sanctuary.

2. Measures like contour/ animal trenching, preferably solar fencing may be considered as per sites specific requirements.
3. Solar fencing with low voltage of power should be preferred to ward-off the wild animals from approaching the habitations. SOP's guideline's issued by competent authority may be followed / referred.
4. Funding for solar fencing may be explored under various schemes including CSR.
5. A well laid standard operating guideline to attend the man-animal cases is already at place. It should be implemented in letter and spirit. The guideline should be reviewed at regular intervals and revised with the approval of the Government.
6. The compensation to eligible beneficiaries should be paid strictly as per the timeline.

6.4.5 Theme plan to Eco-Tourism with people's participation:

Broad objective of Forest Department is to promote Eco-Tourism in Goa, especially in hinterland, for better understanding of nature, wildlife conservation and cultural heritage, while generating livelihood opportunities for local communities in an ecologically, culturally and economically sustainable manner. Following measures are suggested in addition Eco-Tourism is also covered in detail in chapter 7:

1. The Eco-tourism site shall be developed in eco-friendly manner in accordance with Eco tourism guidelines by the Department or in association with Goa Forest Development Corporation. While developing support infrastructure for eco- tourism it shall be ensured that the natural profile and ecological integrity of the ecotourism site including its biodiversity value is maintained.

2. Eco-tourism plan should be prepared appropriately demarcating the eco-tourism zone upon assessment of management requirements of forest, wildlife, their habitat and ecological sensitivity of the area. The eco-tourism zonation should ensure that the ecological integrity of the site, including breeding areas of wildlife remains protected.
3. Eco-tourism should be encouraged and promoted based on science-based planning and shall include the carrying-capacity analysis-based description of the eco-tourism site, time, duration, route, mode of travel and number of visitors, support infrastructure needed etc.
4. Local community is one of the key stakeholders of eco-tourism. Community will be encouraged to participate and be part of the value chain. In order to ensure inclusive and responsible tourism, most of the supplies and services must be sourced from local providers. Their capacity building may be done in spheres of Eco-Tourism including hospitality.
5. Eco-Tourism sites and activities may be identified in Eco-Tourism zone and in Conservation Zone with the approval of CWLW and should be developed as per applicable guidelines.

6.4.6 Theme plan to green job opportunities to local communities:

Forestry activities including Eco-Tourism will provide 'Green Jobs' to local community at their door step which is in line with the overall objective of 'Atma Nirbhar Bharat Swayampurna Goa' Programme of the Government. Preference should be given to local people for seasonal forestry works like plantation, watch and ward, trekkers, fire watchers, rescue works, nursery related works, minor works, creation, maintenance and operation of ecotourism assets and activities. Further, as per requirement training and capacity building of the local community may also be carried out.

6.4.7 Theme plan to Research work, including documentation of base line data:

Following measures are suggested

1. Goa Forest Training and Research Institute, Valpoi shall be nodal agency to develop in-house research capability for creating database on base line biodiversity of Protected areas across State, identifying gaps in wildlife management etc. by employing Researchers and Field biologist with it.
2. Research studies may be carried out by the department in collaboration with research organizations / institutes, experts to study and compile information about the endangered floral and faunal species in Madei wildlife sanctuary.
3. Research volunteers may be promoted through appropriate schemes / funding to take up work study and research in the remote areas of wildlife sanctuary.
4. Short term [3 years], Mid-term [up to 8 years] and long term [up to 20 years] research plan should be prepared and provision for adequate budgetary allocation should be made in the respective annual budget.
5. Research work on lesser known endangered species may be carried out.

6.4.8 Theme plan to Training and capacity building of forest frontline staff and local communities:

1. Regular training and capacity building of the forest frontline staff should be carried out. Annual training calendar may be made with the approval of Chief Wildlife Warden with proper financial outlay.
2. Specially designed courses may also be conducted for identified specialized areas like, forest fire management, wildlife monitoring, forensic science, etc.
3. Exposure visits may also be organized for the frontline staff to enrich them sufficiently and draw benefits from success studies in other parts of the country.

4. Identified interested staff may be sent to specialized training Institutions like, Forest Survey of India and Wildlife Institute of India, Dehradun for long term training. This will ensure availability of trained man power within the Department to take up such specialized works.

6.4.9 Theme plan to Extension activities including seminars, workshops, nature camps etc. for awareness generation among masses especially children:

1. This should be one of the main focus of the Department. Extension activities further strengthens confidence building measure with the local community at the same time helps to sensitize and aware masses for protection and conservation of our incredible flora and fauna.
2. A comprehensive annual plan for extension activity including seminars, workshops, nature camps, awareness camps for local people etc.
3. Department may take up works for the benefit of community like construction of community hall, solar lights, distribution of basic amenity units, honey boxes, sewing machines and similar articles as a confidence building measure activity. Adequate fund arrangement should be made for the purpose.
4. All the important days related to protection, conservation of wildlife, forests, environment etc. should be celebrated by involving local community. Adequate budget should be provisioned.

6.4.10 Closure for Restoration and Rejuvenation: Following measures are proposed;

1. Movement of visitors in the eco-tourism zone during the monsoon seasons should be strictly as per the guidelines approved by Chief Wildlife Warden.
2. The entire sanctuary will be closed for the visitors in case of natural calamities including fire.

6.4.11 Monitoring of Weather and Climate

Department has already set up Automatic Weather Stations [AWS] in the all the protected areas of Goa to study short- and long-term impact of weather and climate change on Biodiversity of Protected Area in Goa. One such AWS is set up at Maloli in Madei Wildlife Sanctuary. The data generated may be collected and analyzed on regular basis in consultation with Indian Meteorological Department, expert institutions, Goa University and others.

6.4.12 Theme Plan for Wildlife Monitoring:

1. SOP for wildlife monitoring should be developed on the lines of SOP's / guidelines issued by MoEF&CC, NTCA, WII and similar institutes from time to time
2. Use of technology including Artificial Intelligence and M-STRIPES should be incorporated.
3. Assessment of hard and soft infrastructures & equipment may be carried out from time to time and should be provided.
4. Camera traps should be placed at identified strategic location covering entire wildlife sanctuary.
5. Training and capacity building of the staff and community may be carried out from time to time.
6. A report on wildlife monitoring in the format to be prescribed by CWLW, may be sent to headquarters on monthly basis for information and appropriate action.

CHAPTER7

ECOTOURISM, INTERPRETATION AND CONSERVATION EDUCATION

7.1 General

Madei WLS is undoubtedly among the promising protected Areas of the state of Goa that caters to the tourist with flare and craving for outdoors; replete with unblemished landscape and teeming biodiversity. The ease of access, friendly staff, relatively small and easy terrain, and above all stay facility gives this PA an edge over the others. Further its proximity to the adjacent state of Karnataka and its ecological continuum with the Kali Tiger reserves raises its bar as an important conservation cum soft-recreation landscape. The current infrastructure though is in dire need of renewal and up gradation if the facilities are to be optimized for nature tourism purpose, while simultaneously conserving its wildlife endowments. Suggested herewith is a comprehensive plan for developing this PA from ecotourism perspective and taking it to its peak of glory as a favored destination for domestic and foreign tourists.

7.2. Objectives

The plan also addresses the following objectives:

- i. To promote nature conservation through education, creating awareness and enhance visitor learning experience for conservation.
- ii. To promote incredible Bio-Diversity, Traditional Knowledge and Cultural heritage of Madei in particular and Goa in general.
- iii. Identification, Development & Promotion of Eco-Tourism destinations to be managed and run preferably by Forest Department, Goa Forest Development Corporation and Local communities.

- iv. Setting up of Eco-friendly infrastructure in conformity with the applicable Act/ Rules / Guidelines.
- v. To create livelihood opportunities and equitable sharing of benefits with the local communities to make them “AtmaNirbhar”.
- vi. Capacity building of all stakeholders and to develop hospitality ethics to provide quality visitors’ experience.
- vii. To evolve site specific code of conduct for visitor behavior and sustainable tourism.
- viii. To develop monitoring and evaluation mechanisms for periodical assessment of the impact of Eco-Tourism on forests, wildlife, and communities and to gain insight on visitors’ satisfaction.

7.2.1. Community based Eco-Tourism:

Local community shall be one of the key stakeholders of Eco-tourism. Community will be encouraged to participate and be part of the value chain. In order to ensure inclusive and responsible tourism, most of the supplies and services must be sourced from local providers. Their capacity building may be done in spheres of Eco-Tourism including hospitality.

7.2.2. Eco-Tourism Facilities & Activities:

i. All Eco-tourism activities shall be in conformity with the laws of the land including the Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 and Wildlife (Protection) Act, 1972. While developing support infrastructure for Eco- tourism it shall be ensured that the natural profile and ecological integrity of the Ecotourism site including its biodiversity value is maintained. Permanent structure shall not be made /constructed to create Ecotourism facility/structure. Eco-Tourism activities shall be carried out as per MoEF & CC, Government of India guidelines amended from time to time.

ii. Eco- Tourism facilities will be developed and activities will be carried out in demarcated areas of Eco-Tourism Zone and Conservation Zone only. Further, carrying-capacity of new eco-tourism site is to be determined by considering the wide diversity of environmental, physical, social and economic criteria of development and management of Eco-tourism sites. The Ecotourism activities shall particularly ensure that the ecological integrity of the site, including breeding areas of wildlife remains protected. The Eco-tourism plan should factor in aspects of control of plastic pollution, waste management, noise pollution, sewage treatment and disposal, etc. The activities shall also ensure that safeguards provided in the Forest Rights Act, 2006 are fully respected.

7.3 ISSUES/PROBLEMS/CHALLENGES

The major problems in achieving its objectives of bringing about effective implementation of ecotourism initiatives, nature education and awareness programmes in Madei Wildlife Sanctuary are listed as follows:

Sr. No.	Objective	Issues/Problems/Challenges
1	Facilitate safe and sustainable eco-tourism	Inadequate and dilapidated ecotourism infrastructure facilities considering the potential of Madei WLS. Cottages and other facilities need to be upgraded or added. Lack of well-designed tourism packages and marketing etc. Nature Education Centre/Nature Interpretation Centre needs immediate attention to be upgraded to make it more resourceful and purposeful. Lack of information in the form of booklets, pamphlets or posters on the biodiversity of the sanctuary. Lack of proper defined protocols for promoting

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		nature trails ventures or nature photography or Zoological Park visits and limiting habitat degradation. Carrying capacity of the site is not determined
2	Create awareness for promoting wildlife conservation and confidence building measure in the fringe areas.	Little or no community involvement in ecotourism related activities. Less number of trained staffs to address diverse needs of creating awareness, monitoring ecotourism ventures etc.Limited awareness programmes conducted to promote wildlife conservation and sensitization of general public. Inadequate data on carrying capacity: Carrying capacity of visitor per day is not fixed.
3	Encourage Community participation in eco-tourism activities	Local community lack expertise as trained nature guides or in participative ecotourism activities. Lack of involvement of community in ecotourism ventures and conservation works.

7.4. THE STRATEGIES

Strategies for promoting ecotourism are laid out in the following chapter with special focus on achieving the objectives.

Sr. No.	Objective	Strategy
1	Facilitate safe and sustainable eco-tourism (Ecotourism infrastructure)	Strategy for Promoting Ecotourism ventures and infrastructure and ensuring least damage to the habitat and least disturbance to wildlife. a) Nature Trails: There are many important nature trails in the sanctuary. Nature Trails need to be upgraded with required information and more interactive signages. b) Nature Education and Interpretation center: The existing NIC and NEC needs to be upgraded to provide appropriate information. The center needs to be renovated to make it more purposeful and resourceful. c) Preventing habitat destruction and strengthening ecotourism infrastructure: To protect the habitat from destruction the ecotourism zone needs to have Signages of Dos and Don'ts. Signages to Understand visitor obligations and responsibilities needed. Also carrying capacity of the area needs to be determined. d) Infrastructure Upgradation: All dilapidated ecotourism infrastructure needs to be refurbished and renovated. Further new ecotourism initiatives such as tented accommodation, nature camps and other amenities required for the visitors need to

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		Be as per the guidelines issued by the state government from time to time. Watch towers need to be upgraded for promoting ecotourism as well as for monitoring wildfires. Since the Goa Forest Development Corporation (GFDC) has been nominated by the State Government as the nodal agency to promote Eco-tourism in Forest and Protected areas of the State, the GFDC be also involved in developing Eco-tourism sites in the sanctuary subject to applicable laws/ Rules and guidelines framed by the State Government. e) Ecotourism packages and Marketing of tourism ventures: There is lack of well-designed tourism packages etc. Tourism packages should be created and modalities need to be laid out for making it more economically viable and sustainable.
2	Create awareness for promoting wildlife conservation and confidence building measure in the fringe areas.	Need to organize awareness programmes involving community. a) To create awareness on nature conservation through various on-site and off-site activities/programmes. b) Entry Point activities with the local villages. c) Conduct nature awareness camps or study tour for students of various educational institutions and general public. d) Programmes to gain the cooperation of the public and NGOs.
3	Encourage Community participation in ecotourism activities.	Promoting community involvement in eco-tourism works a) WLS to be considered as community asset rather than only as a national asset. b) Encourage involvement of local community to be more involved in participatory conservation and tourism promotion works. c) Eco-Development Committees may be formed and Strengthened

7.4.1 ECOTOURISM THEME PLANS

Sustainable ecotourism needs to be promoted in Madei without disturbing the habitat and the wildlife and should conform to the Forest (conservation) Act, 1980, EPA, 1986 and Wildlife (protection) Act, 1972. Temporary structures made should be of natural material of local origin as per MoEF&CC, Govt. of India guidelines issued time to time. The WLS at present has inadequate publicity facilities, lacks sufficient purposeful signages, brochures, pamphlets and publicity materials for promoting ecotourism. As a result, the actual tourism potential of the sanctuary is not properly harnessed. The following theme plans are suggested for promoting ecotourism.

7.4.2. THEME PLAN FOR RESTORATION/RENOVATION OF NATURE TRAILS

The existing 14 important Nature trails need regular attention to make them more beneficial to the tourists. Nature trails are popular for wildlife viewing, walking and hiking. Tourism needs to be developed with the aim to provide conservation education, wilderness experience to genuine enthusiasts in particular and to the interested public in general. All the 14 trails need to be regularly upgraded to attain its objective. The works recommended are Upgradation of nature trails by improving trail threads, installing trail signs and beautification to make it more purposeful.

i) SUSTAINABLE TRAIL TREAD

All trails need to be redeveloped using natural material to create a low negative impact and give natural-looking path with minimal disturbance to vegetation. A sustainable trail needs to be designed which has least maintenance and can withstand severe weather conditions and erosion impact, especially during the monsoons. The primary key to develop a sustainable trail is to build it on the side of the ridge, slightly slanted outward, and kept clear of rocks, branches or other debris several yards on both side of the trail. Local material should be used for the repairs and maintenance of the trail paths. Lateritic material is abundantly found locally could be used for base line, with over lay of soil and silt.

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Regular maintenance of tread of the trails is required. (Ideal sustainable trail tread preparing protocol: Mineral soil - composed primarily of sand (0.05 to 2.0 mm – coarse texture), silt (0.002 to 0.05 mm – medium texture) and clay (0.002 mm – fine texture). Soil with a high percentage of silt, moderate percentage of sand and small percentage of clay makes a very durable tread).

To give comfort to the visitors, resting shades/ areas may be placed at suitable locations. These need to be made of natural material. The natural material available locally may be used for this purpose in a limited way.

TRAIL SIGNS

Trail maps, trail head marker and/or bulletin boards are useful for conveying information to visitors about the trail. Four types of signs may be needed: Trailhead sign, confidence markers, directional signs and warning signs.

Trailhead sign: Needs to be placed at the beginning of the trail. It should show trail route, key features along the trail, a “you are here” mark, north arrow and map scale or distances along major trail segments. Display Boards of information of flagship species of plants and animals at the start point are also helpful.

Confidence markers: The red and green confidence markers may be placed at every 50m need and repainted periodically. Confidence markers need to be placed strategically along the trail after 50 m or at significant turns or where tread is indistinct. Besides rocks, paint marks on trees may also be used.

Directional signs: A directional marker is needed to direct trail users to the trailhead or at a sharp bend, fork or trail crossing. These signs should be placed at trail intersections, and should provide information about where each trail leads and how far away the next significant feature can be found.

Warning signs: Warnings, including hazards along the trail indicating approaching sites of venomous snakes, steep cliffs, falling rocks, unsafe drinking water etc. and also environmental features that must be protected such as fragile vegetation, rare animals, natural spring etc.

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Trail Entrance: The entrance of the trail can also be made more appealing with arches of natural material.

TRAINED NATURE GUIDES

The educated youths from the local villages may be absorbed and trained as nature guides through expert organizations. They shall be engaged compulsorily with the nature enthusiasts visiting nature trails. Department shall fix the fees for trained nature guides. Nature guides may be part of the eco-tourism packages.

EDUCATION AND INTERPRETATION CENTRE

Nature Education and interpretation centers (NEC/NIC) needs attention with respect to making it more purposeful and resourceful. Renovation of the existing NEC to provide information on the sanctuary and its biodiversity value is recommended. The entire block has to be reorganized and additional sections need to be added to make it more effective to serve its purpose. Further, it is recommended to create additional space for the Centre at the sanctuary.

Following sections are recommended for reorganizing the NEC:

INFORMATION SECTION: This section needs to be equipped with resources such as pamphlets/booklets/posters to provide information on the faunal and floral diversity of Madei WLS. Both, education as well as publicity materials such as leaflets, brochures, pamphlets, posters of ecotourism ventures and biodiversity of Madei WLS, needs to be available in this section for various target groups. These may be provided to the tourist for a fee in the ecotourism packages.

INFOGRAPHIC GALLERY: This section should have exhibition gallery, to displays the fauna and flora of Madei WLS. These digital Info-graphic boards of endemic species of plants and animals should be able to create a landmark experience and awareness on the local biodiversity and nature.

AUDITORIUM: A mini-auditorium of 100-seater capacity needs to be part of the nature interpretation center. Necessary interpretation materials/wildlife movies, documentaries etc. may be featured in the auditorium for effectively interpreting the

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values of PA/ different groups of plants and animals. Alternatively, an Audio visual room may be developed with equipment's - TV, LCD projector, Computer etc. for serving the same objective.

LIBRARY SECTION: This small section needs to have information on wildlife of Madei /Goa, Books related to wildlife, Monographs, Publications on Madei wildlife sanctuary and research journals for those interested in further details about the flora and fauna.

SOUVENIR SECTION: As a memory or a gift to be given, every visitor would like to take a memento or souvenir of the place visited. A souvenir shop at the WLS would serve this purpose. The souvenir shop would display for sale specially designed items like key chains, mugs, T shirts, pens, plaque etc. This section could also exhibit and sell local products (fruits, kokum, etc.) from the forest or the products made by local community associated with the Madei WLS. It can harbor locally made artifacts depicting the endemic fauna of Madei which can be serving as souvenirs.

7.4.3 THEME PLAN FOR STRENGTHENING ECOTOURISM INFRASTRUCTURE

To facilitate safe and sustainable eco-tourism and minimize negative impacts on the wildlife and environment while promoting ecotourism, utmost care needs to be taken to ensure protection of the habitat.

CODE: A document of 'Code of conduct for Ecotourism in Goa' needs to be prepared for the visitors.

- a) **SIGNAGES/HOARDINGS:** There is a need to develop appropriate hoardings/signages Displaying DO's and Don'ts to be place dinstrategic locations. Besides hoardings, flyers of Dos and Don'ts need to give to the tourists as part of the ecotourism package kit.

Suggestive list of Dos and Don'ts is as follows:

Do's:

1. Conserve the flora and fauna in its natural environment
2. Maintain silence, animals love peace.
3. Ask for prior permission when taking photographs.
4. Dispose all non-degradable at appropriate designated places/ bins.
5. Follow all guidelines given in the 'Code of Conduct' document given by Goa Forest Department.

Don'ts:

1. Do not litter the surroundings with pet bottles, wrappers or plastic.
2. Smoking is prohibited.
3. Do not consume alcohol, drugs or any other in toxicants.
4. Do not listen to radio or any other electronic entertainment equipment at high volume to avoid disturbing wildlife.

b) **WASTE DISPOSAL:** A system for waste management may be introduced. Plastic should be totally prohibited in the Sanctuary. Monkey proof waste bins may be located at strategic locations in the eco-tourism zone. Option of composting of canteen waste generated may be considered.

c) **CARRYING CAPACITY:** An exercise of determining the 'Tourist carrying capacity'/'Physical Carrying capacity of tourists needs to be conducted for Madei WLS. Once carrying capacity is determined, it will ensure sustainable ecotourism without causing destruction of the physical, economic or socio-cultural environment. Mow forth and Munt formula may be used to determine the carrying capacity.

E.g.: This is normally assumed to be around 1m per person.

"PCC per a day = area (in meters squared) x visitors per meter x daily duration" (Mow forth and Munt).

d) INFRASTRUCTURE DEVELOPMENT

i) Nature camps and other facilities:

There are no functional cottages and dormitories in the wildlife sanctuary. These facilities need to be created as per the carrying capacity. Further new ecotourism initiatives such as tented accommodation and nature camps and other amenities required for the visitors need to be as per the guidelines issued by the state government from time to time. The proposed structures or any non-invasive conservation-oriented ecotourism initiative can be undertaken in the sanctuary as per the ecotourism policy

ii) **Watch tower:** There are six watch towers inside the sanctuary, two in eco-tourism zone, All the existing watchtowers need to be upgraded periodically. One large viewing tower need to be constructed near the central place in the sanctuary for briefing the visitors and to understand the topography of the Sanctuary.

iii) **Roads:** The existing tar road of the Madei WLS can be maintained in the present form. All the existing Protection paths/Fair Weather Roads need to be regularly maintained immediately after the monsoons. Further the roads which connect the different infrastructures may be maintained in a best possible manner.

7.4.4 THEME PLAN FOR PROMOTING ECOTOURISM VENTURES AND TRAINING OF STAFF

Well-designed tourism packages etc. should be created and modalities need to be laid out for making it more economically viable and sustainable. This revenue generating potential should be tapped owing to the richness of endemic wildlife at Madei Wildlife Sanctuary.

a) ECOTOURISM PACKAGES

The community needs to be involved in the ecotourism related activities at Madei. All the packages may be operated through various Eco-development Committees along with Department Goa Forest Development Corporation in the Sanctuary under the supervision of Forest Department. This will also serve as an additional employment opportunity to the local people there by increasing their living standards. The packages need to be publicized on the website of the forest department and Tourism Department to make economically viable options.

There is a need to plan out a full-fledged document on the modalities of different packages and their tariffs and revenue sharing between the Eco-development Committees' and the Forest Department. Local culture and cuisines may be added in the package.

b) MARKETING

Marketing is essential to promote ecotourism and give wider publicity to the ventures offered at the Sanctuary. Different means by which marketing can be done are listed below:

1. Portal on the website depicting relevant information on the Sanctuary may be developed and updated periodically. A separate website needs to be developed for Madei WLS to provide information regarding the faunal diversity and awareness camps to the public, nature trails and the different packages offered. Assistance of GTDC may be taken.
2. Digitalized online system of online booking of facilities and ecotourism packages along with provision for online payment need to be worked out (IT infrastructure).
3. Develop education /publicity materials such as leaflets, brochures, pamphlets, posters, etc. for various target groups and also to be displayed on the website.
4. Publish annual report on the various tourism programmes to boost tourism.

5. Trekking, Wildlife Safari, Bird Walk, Accommodation, Zoo Visit, all eco- tourism packages should be available for online booking.

c) TRAINING OF STAFF, NATURE GUIDES AND COMMUNITY

Since there is no specialized staff designated for conducting education and awareness programmes, a proposal may be moved for creation of a post of forest official to oversee the ecotourism works for the Sanctuary. Alternatively, the forest guards may be assigned this work as additional duty.

- I. **Staff Training:** The existing staff members are not trained in organizing awareness programmes and eco-tourism activities. Therefore, there is a need to provide proper training to the staff members involved in organizing the awareness programmes.
- II. **Training of nature Guides:** The unemployed local youths can be trained as nature guides. Already trained guides may be again be trained on hospitality, local biodiversity, communication etc.
- III. **Training the locals in eco-tourism:** there is a need to constitute 'Economic development Committees 'in the surrounding villages. Since this is commercial venture, the locals need to accept and develop professional outlook of eco-tourism. This can be done by organizing workshops that practically prepares them for their new assignment. Staff and EDC members involved in conduct of nature education activities may be given training in communication skills and education and interpretation and responsibilities.

7.4.5 THEME PLAN FOR AWARENESS, SENSITIZATION AND COMMUNITY PARTICIPATION

More awareness programmes to be conducted to promote wildlife conservation and sensitization of public. Conservation programmes must attempt to reconcile livelihood security with wildlife protection. Involving community for restoration of degraded habitats outside protected areas and making them aware of PA objectives including the control of fire, prevention of overgrazing, disease and poaching is needed.

To enhance community involvement, it is essential to create stronger associations with the local Panchayat. Connecting with local communities living in the fringe of the sanctuary to understand their culture, handicrafts, cuisine, folklore, traditional knowledge etc. This will give locals an opportunity to collaborate and support eco-tourism ventures in the sanctuary.

Community participation may be sought in the following activities:

- **Wage Employment in restoration of degraded habitats and other habitat management activities**
- **Local people to be encouraged to participate in the eco-tourism ventures by**
 - Through EDC, the local people to be involved in the management
 - Making arrangement of local cuisine for tourists.
 - Selling local artifacts in the souvenir section of the Nature Education Centre.
 - Displaying their cultural heritage folk dances/folklores for tourist's as cultural performance.
 - People from EDC/Guides will be the part of eco-tourism packages

- **Local people who reside in the vicinity of the sanctuary can be imparted training to empower them to:**
 - Be 'Nature guides' and engage the visitors and tourists in nature trails by giving them information about the rich biodiversity.
 - Be 'Guides' to interpret the nature and communicate information from 'Nature Information Centre' to the visitors and tourists.
 - To make saleable handicrafts and food products to be promoted for sale in souvenir section of nature information center.

- **Sensitize the community by:**
 - Organizing film show, exhibitions etc. both for rural and urban populace including Students and people in fringe areas
 - Hold periodic competition sand programmes for students and academic community.
 - Promote more newspaper articles on wildlife conservation reflecting initiatives and ventures of forest department.
 - Brochures/pamphlets on benefits of nature trails, nature photography, wildlife etc.
 - Continue with the annual events such as wildlife week, vana-mahotsava and Bird festival.
 - Promote environmental conservation in schools for school children.
 - Conservation programmes must attempt to enhance livelihood opportunities.
 - Conducting frequent nature education camps, paid camps and eco-restoration camps for different target groups.
 - Undertake more entry point activities in the adjoining villages to get the support in the wildlife management.

CHAPTER 8

ECO-DEVELOPMENT

8.1. Objectives

One of the major objectives of this Management Plan is to take people in and around the Madei WLS on board, through involvement and thus elicit their support in the ultimate goals of conservation of wildlife and minimize negative impact on this protected through appropriate development of the villages in and around the PA by planning.

8.2. Specific Issues

The forests of the incumbent PA have been traditionally offering livelihood to the communities here besides fulfilling all their requirements of cultural socioeconomic spaces. The same forest that got notified as Protected Area have earlier been their savior, thus alienating them post-notification as a Wildlife sanctuary. Obviously, some amount of resistance and sense of deprivation is bound to set in and simmer with passing time. The greatest challenge now before the forest authorities is to reduce the dependence of the forest dwelling communities on the Madei WLS forests and at the same time provide them sustainable alternatives, while giving them meaningful role to play in the conservation mandate. No conservation efforts can yield results, if the local community does not willingly partner with the authorities. Further in the light of settlements in side and on the edge of the PA, the human-wild animal interface is a major management concern. Human injury, loss of Milch cattle, crop damage is all dimensions of this potentially hostile interface and needs pragmatic long-term solutions. As from the perspective of the wildlife, encroachments by people on wildlife habitats, habitat degradation due to grazing by livestock, exploitation of wild timber, construction of pathways, retaliatory killing

of wildlife and non-permitted tourism are all pressures on the wilderness.

It is here that compatible Eco-development should commensurate and compensate and negate the negative impacts on either side.

Eco-development plans should include and address all potential aspects of conflict interface and gain confidence of the local community such as:

1. Fodder Cultivation for Livestock
2. Soil and water Conservation
3. Promotion of Non-Conventional Energy
4. Safer and modern Animal Husbandry practice
5. Human Wildlife Conflict mitigation
6. Ecotourism opportunities for locals

The interventions must be need based and micro-planned. Issue specific to Madei Wildlife sanctuary are as follows:

a. Resettlement of the community from PA precincts on voluntary basis

A pragmatic and purely voluntary resettlement scheme that assures adequate compensation and rehabilitation may be formulated in accordance with Resettlement and Rehabilitation policy of the Government in vogue with approval of State Government. Any villager residing within the Wildlife Sanctuary, who voluntarily decides to get resettled outside the sanctuary limits, may avail the benefits of the scheme, to get resettled. Such resettlement shall be done only after obtaining prior approval of the State Government.

b. Capacity Building for Conservation through Education

The Madei WLS official must invest in building awareness of target population on importance of wildlife conservation through camps, competitions on occasion of various commemorative days. In all these events the focus should be on 'Humans and Wildlife: Conflict to co-

existence'. The local schools and colleges must be invited to participate in these events and wide publicity must be given in print and electronic media. On the occasion of *Vanmahotsava*, students and community must be encouraged to undertake plantation drives in appropriate places.

c. Popularization of Non-Conventional Energy

A major pressure on the forests of this sanctuary is the requirement of fuel wood and timber by the local community. The state Government can on trial basis start a depot of wood at convenient place on subsidized rates to the forest dependent communities. People should be encouraged to grow fuel wood species in their settlement outside the sanctuary limits. As many of these communities have cattle heads, biogas from animal wastes can be a good intervention and the appropriate government agency could be invited for linkage. Solar energy panels must be popularized and subsidy offered. Gratis installation through CSR initiatives of corporate could also help in this regard. Gas stoves could be provided for minimize in requirement of fire wood. Also, some provisions should be made to provide wood for cremation purpose.

d. Village level Monitoring Committees

Taking the community into confidence will dissuade them from anti conservation activities and instill in them a sense of belongingness. Members of villages surrounding the PA including those from the Ecologically Sensitive Zone must be identified and invited to form a Monitoring Unit/ Committee. The said unit should sync with the forest officials on gathering information critical to conservation management of wildlife such as Animal Movements, Conflict incidents, straying of wildlife, Accidents involving wildlife, poaching and hunting for wild meat, extraction of wood from the PA etc. The committee should meet on monthly

basis with the Round Forester or Dy. RFO to review their work, and also recognize the service rendered by the community in a public forum.

e. Fire control

The local community has an important role to play during the dry season when prevalence of man-made fire is high. Teams should be constituted and allocated specific area for active surveillance outside the PA. As soon as a fire incident is detected the team must alert the nearest Beat Guard for the needful action.

f. Anti-poaching/Compensation for Wildlife induced Loss Units

Range Officials can also build a system of intelligence to gather information on wildlife crime and effect deterrence. The same committee can also liaison for compensation towards cattle depredation and/or attacks on life stock and humans by wildlife, crop damage by raiding wild herbivores etc. This will ease the tensions and repose faith in the mechanism.

g. Ecotourism and Cultural Tourism

The local community has a rich cultural heritage in terms of folk art, cuisine, crafts and knowledge and skills regarding the forests. As such these are valuable resources for ecotourism and must be sustainably tapped for mutual benefits. The Madei WLS must optimally utilize these human resources and showcase them to the visitors under existing ecotourism and cultural tourism. The community must be encouraged to showcase their culture and be appropriately and respectfully incentivized for the same. The youth from these communities can be trained in birding, herping etc. and can serve as Ecotourism guides during various seasons including rains when there is general slack in tourism. Ticketed performances can be organized at the amphitheater on certain days of the week where the tribal artists can present their art forms.

h. Sustainable utilization of NWFP through lateral lines

Though much research data is available on the utilization aspects of non-timber forest produce plants, there is little information generated so far on their extraction and conservation aspects. The Forest department must collaborate with regional research organization and local bodies such as the Goa State Biodiversity Board (GSBB) and the Biodiversity Management Committees (BMCs) of villages to conduct and or collated at a arising from studies on increasing the production of NWFP plants in their natural habitat and in other available lands. Scientific extraction methods must be developed and shared with forest managers and also gatherers to prevent destructive harvesting of medicinal and other non- timber forest produce from Madei WLS. Research in the areas of *in Situ* and *exsitu* conservation, cultivation technology and harvesting are also a need of the hour. Bio-prospecting is another emerging area that needs immediate attention *vis-a-vis* the NWFP of Madei Wildlife sanctuary.

Over the past two decades, governments, conservation and development agencies and non-government organizations have encouraged the marketing and sale of NTFPs as a way of boosting income for poor people in the tropics and encouraging forest conservation.

8.3. Broad Strategies

8.3.1. Recommendations for effective Protected Area Management, Conservation of Wildlife and Eco-Tourism

1. Regular Training and Periodic Refreshers' courses for administrative and field staff

Regular updating is a driver to improve functional competence, appraisals and incentivization for efficient work are key drivers of optimum output by the staff across the hierarchy of the range office.

The forest brigade should regularly visit the field and assess the wilderness. Needless to say, such proactive stance is rare and difficult to achieve in absence of an enthusiastic leadership. Also, regular opportunities for learning new developments in the field of wildlife management must be provided through annual Training Program for cadres below the RFO at the Forest Training School with the help of senior Officers and Invited Experts from institutes of national Repute like FRI and WII, Dehradun, in Uttarakhand. Regular feedback from Beat Guards can help monitoring the PA with reference to animal sightings, movements, breeding season, phenology of trees, fodder dynamics, and Prey Base. Given that Madei WLS has resident population, an alert field staff also helps in monitoring movement of people and as deterrent against illegal wood felling, poaching, cattle grazing and trespassing etc.

Dedicated workshops and Training programmes on Ecotourism shall be a great value addition to the staff here. The administrative staff must be cyber-literate and able to independently handle basic computer operations, just as the reception personnel must be trained in soft skills, conversational English, and hospitality etiquettes. The visitor interface should be manned by staff reasonably conversant with the wildlife of the PA to be able to respond to queries of the visitors. Field staff must be trained in handling field equipment such as GPS Equipment, Wireless communication, and also be familiarized with local flora and fauna. Basics of soil and water conservation management must be imparted to the entire brigade.

The RFO must strike a balance between being a custodian of the PA and the friend of the local community to evoke goodwill and participation of local people in conservation efforts. The Ranger must have his trustworthy informants to get critical information in averting and investigating Wildlife Crime in his Jurisdiction. RFO must be seen by his subordinates and other stakeholders including the community, taking rounds of his PA.

Often with age, the physical fitness gets compromised and as such the staff must be encouraged towards being health conscious through organized Health camps and awareness programmes by inviting the medical fraternity from the Government sector.

Basic hands-on training in First Aid and handling of critical situations such as Snake Bites, Bee Stings etc. must be imparted to field staff. Necessary Anti-venom serum must be procured and available in the nearest Health center for dealing with emergencies arising within the PA limits.

2. Butterfly Park creation

This facility is popular among the visitors and needs to be created to augment visitors experience and its educative value. Host and food plants collection must be augmented to attract more species, and signage must be attractive and easy to interpret. A dedicated ranching section will add value to this facility. These guides can be trained from among the local youth. A separate set of specific recommendations have been given in the section on Butterfly Garden elsewhere in this document.

3. Vulture Conservation through community involvement

Critically endangered Slender billed vultures were once very common bird in the area, the sanctuary offers ideal nesting habitat for the critically endangered vulture species. So, reintroduction of locally extinct bird through community involvement is need of the hour to restore the glory of vulture land scape. A scheme to incentivize public cattle carcass which are free of Diclofenac and other harmful chemicals shall be devised to encourage people to directly participate in vulture conservation programme.

Vulture being one of the rare birds in the wild, such vulture restaurants will attract many enthusiastic birders and photographers across globe which would in turn spin a vulture based green economy to the local population in and around sanctuary.

4. Regulation on entry and movement of private and hired vehicles of tourists & visitors in the PA precincts

Currently in absence of transport facility for visitors desirous of entering the PA, private and hired vehicles are allowed to ferry tourist within the Madei WLS. However, as the area is protected and teeming with wildlife, speed limits, ban on using horn, Flash Head lights and deviating from designated motorable roads cannot be monitored. Also, in event of accidents and unforeseen calamities, the safety and security of the vehicle and passengers can become a contentious issue. As such, many visitors drive in with their vehicles completely flouting the code of the forest, posing a threat to the sanctity and integrity of the PA.

Thus, to ascertain plying of well-maintained sturdy and field compliant vehicles, disciplined driving ensuring safety to the occupants as also to enhance visitor experience and improve the chances of sighting of wildlife, it is suggested that entry of private and hired vehicles may be regulated. However, as there are many settlements in the PA limits the vehicles of the residents and visitors of these villages will have to be identified and exempted and issued a separate pass at 'no cost', but with fixed period validity and renewal procedures. This proposition may evoke resistance, but will additionally help generate revenue for the range.

As such, the range office could be given grant to procure requisite number of vehicles, ideally 4 wheel drive Jeep (Open top roof Maruti Gypsy) and Canter (open top roof bus open jeep and canter Open bus).

5. Construction and maintenance Patrolling Paths and Nature trails:

Within the wildlife sanctuary the existing patrolling Paths and Nature trails shall be maintained. It may be ensured that the Patrolling Paths remain in motorable conditions round the year through appropriate maintenance. For this purposes bridges culverts wherever needed shall also be constructed. The patrolling paths shall be untarred and single

lane so that no significant damage is caused to the adjoining Forest area. New patrolling paths and Natural trails may also be constructed wherever required with the prior approval of CWLW. However, if wider metaled road is requires to be constructed than prior approval under Van (Sanrakshan evam Samvardhan) Adhiniyam 1980 shall be obtained.

6. Human Wildlife-Conflict/ Crime Mitigation

Sattari taluka has a good forest cover commensurate with the habitat requirements of wildlife. As such in absence of boundary consolidation and shortfall in active surveillance and round the clock patrolling, there are chances of wildlife crime including poaching, tree felling etc. similarly, the wildlife may be compelled to take excursions outside their forest habitats in the nearby settlement areas for crop raiding, predation on livestock as also in search of water in dry season. Whatever be the cause, when people and wildlife violate boundaries, conflict is inevitable. Carnivore raids on livestock and pets is of common occurrence, just as people from the adjacent villages are apprehended while on hunting spree in the jurisdiction of the PA, by the alert Forest Guards. Keeping the PA sacrosanct and inviolate, shall ensure that people in the adjoining area shall remain safe too. However, for this the conflict interface needs to be identified and mapped and Mitigatory interventions affected. Following are a few recommendations

- a) A general awareness of all stakeholders on HWC is a prerequisite, and the range office must address the local community through talks, films and other portals on occasions such as wildlife Week, as also disseminate information in local languages to alert people on the potential threat and ways to address/lessen this threat perception. Cultural practices and rituals that require felling of trees and hunting of animals must be phased out by engaging the community in a dialogue

and by providing sustainable alternatives

- b) A dedicated team for wildlife rescue must be trained and available at the Range office to respond to emergency. Currently only a few RFOs in the department have the training and expertise in Tranquilizing capture and translocation. Backup team must be created through training and deputation for hands on experience.
- c) The range office must be equipped with the necessary paraphernalia for Capture and Restraining of wildlife that has entered human habitation. On rescuing the animal, before translocation or shifting it to Bondla for recuperation, the animal needs an interim housing facility, which currently is not available at Madei, the same may be created. Detention facility for accused/suspect in wildlife crime should be preferably available at Madei before the suspect is handed over to judicial proceedings or Police Custody.
- d) Assessment of prey base for flagship carnivores will help prospect carnivore attacks on live stock and pets outside the PA limits. Likewise, regular monitoring of fodder and water availability can help regulate access to Grass Plots and waterholes.
- e) Villagers must be sensitized to the risk of predation and depredation; and their capacity built for better carnivore proof livestock enclosure, safe conduct at dusk and dawn. Farming community around the PA is at the receiving end of crop raiding wild ungulates like wild boars and Gaur herds. Losses inflicted by these raiders trigger intense revulsion towards wildlife in absence of robust, effective and quick mechanisms of compensation. These grey areas must be addressed for an immediate relief to pastorals and farmers affected by such episodes.
- f) As deterrence to crop raiding wildlife, live fencing of non edible flora may offer some relief. Landscape interventions like Nonlethal Carnivore-Herbivore Exclusion Barricades (NCHEB) can be tried

in strategic areas.

- g) Signage on potential conflicts and safety precautions must be prominently displayed in surrounding villages.
- h) Any episode of conflict resulting in loss of property and life must be taken up on priority for compensation as per the law of the land; however, mechanisms and modalities for disbursing interim relief should be established to earn goodwill from the victim and reduce hostility towards wildlife.

7. Forest Carbon Stock assessment

Among the many issues of global concern is the climate change, adaptation and mitigation. The forests play an important role in climate adaptation as well as mitigation, by sequestering the atmospheric carbon and storing it in biomass. The ecosystem diversity of Indian peninsula with its corresponding diversity of forest types contribute very significantly to climate modulation and slow down climate change. The forest biomass is indeed a Stock of sequestered carbon and plays an important role in slowing down climate change. Forest and climate change are intrinsically related. Forests regulate not only climate but also local meteorology. It will be useful to empirically determine using standard techniques available, the Carbon sink function of Madei WLS and extrapolate that to assess Forest carbon Stock. Such estimates give empirical contexts to the carbon sequestration functions, and can be useful in implementation of forest conservation and mitigating forest decimation as also in criminal proceedings involving deforestation.

8.4 Village level Site Specific Plans

In absence of previous data, the village level site specific strategies cannot be prescribed randomly and arbitrarily, and shall have to be evolved by the RFO after perusing this Management Plan comprehensively and considering the long-term goals.

8.5 Monitoring and Evaluation

The various micro-plans must be continuously monitored and evaluated by the senior officers of the rank of ACF and revisited and revised if need be. RFO has to review it on quarterly basis at least.

CHAPTER 9

RESEARCH, MONITORING AND TRAINING

9.1 Research

Research and monitoring are crucial for effective and pragmatic management of a protected area. Research allows validation of existing information and creates new information addressing critical gaps in holistic understanding of issues related to wildlife management and conservation challenges. Research if properly conducted can infuse confidence in the crucial data that accrues from observations in the field, whereas Monitoring gives the Manager an edge in terms of testing effectiveness of certain ideas and improvising on management strategies. Research and Monitoring should complement each other for meaningful outcome. R&M also allow the staff getting acquainted with newer gadgets and equipment's.

The staff of the Ranks of Round Foresters, Dy. RFO and RFO must be regularly given opportunities to further their competence through short term deputations for training in Wildlife Research and Monitoring.

In so far as Madei WLS is concerned, the academia and researchers from different states regularly conduct study, but chiefly the interest group is birds. A few studies have also happened on Lichens and Bryophytes of this PA. Mostly the naturalists have documented a lot of butterflies and Birds here, but the mammals and other lesser-known groups such as reptiles have been lesser explored.

The PA can utilize GFTRI, Valpoi Unit to conduct research by engaging Field Biologist and Researchers for conducting, requirement based scientific and managerial studies and collate the same as Technical Reports on various groups of biodiversity. The effort can also be optimized by roping in the biodiversity management Committees of the VPs of villages in the proximity of the PA, as such hand holding will be mutually

beneficial.

The ACF (Research) cum Principal, GFTRI must moot novel ideas to foster a culture of research focused on this PA in collaboration with several established research institutions and individuals of the state and beyond.

9.2 Monitoring

Wildlife monitoring programs is indeed a core component of conservation management and, if integrated fully into the management and decision-making process, monitoring can play three important roles:

1. Firstly, it can provide managers with information on the status of wildlife populations before deciding on the appropriate course of conservation action to take.
2. Secondly, monitoring programs can evaluate the effectiveness of management actions relative to stated objectives
3. Thirdly, in dynamic management system, monitoring can provide the important feedback for identifying actions that lead to the success or failure of a particular conservation strategy, in order to specifically review and improve upon future management initiatives.

It must be emphasized that effective monitoring programs need the availability of sufficient, enthusiastic and trained staff, a feasible timeline and work-plan for implementation, and an adequate budget that covers all associated costs.

Monitoring should include the following parameters:

a. Physical changes

Included under this are demographic changes, occupations, land use patterns, anthropogenic pressures on the PA, tourism and other allied development that could be contradictory to the goals of the conservation mandate.

b. Vegetation

Flora has a major bearing on the habitat value of the landscape, as it offers fodder, shelter, microclimatic modulations and also serves as

natural buffer against adverse climate. A few ecological attributes like succession, preferred plants of food value could be of great importance. Monitoring Man-Animal conflict also is critical for inviting community participation in wildlife conservation.

c. Wildlife

Wildlife diversity and population are perhaps the most crucial elements of monitoring from conservation management purpose. Normally such population enumerations must be periodically done within the PA, either by Water Hole census, Road Transects. Mortality of wildlife is a disease often-ignored data and this gap must be filled through monitoring. Carnivore movements could be an area of interest and the necessary expertise and equipment maybe requisitioned.

d. Wildlife Health

In management of wildlife, health and vigor of wildlife is a critical issue and must be monitored actively. Zoonotic spillover interface if any must be identified and addressed. Areas where livestock mixes with wild ungulates are potential sites of transfer of pathogens. Parasitic load, nutritional deficiency diseases, epidemic out breaks must all be very closely intensively monitored.

Finally, all the information generated must be collated and stored in a Documentation Centre in hard and soft copies. A dedicated staff maybe assigned the task of regular entries and retrieval of data.

Action Plan

It is important to remember that Wildlife Disease data is crucial for management of a Sanctuary, and the PA team must proactively collect data on this count, by training field staff like Beat Guards for disease surveillance on regular basis.

The following recommendations may be given attention to:

- There must be a general awareness and capacity building of staff at all levels towards recognition of Wildlife Disease.
- Human-WildlifeInterface must be identified, mapped and

monitored.

- Strict ban should be forced on poaching illegal hunting and consumption and sale of Bush Meat in the local community.
- Seasonal sampling may be done to examine scat and pellets of Carnivore/herbivore species and examined for parasites.
- If any signs of disease are noticed in any individual or population of a species, the same may be reported and movements monitored.
- Watch on Water Holes specially during the dry season will give an idea of transmission interface, as such camera trappings must be analyzed regularly.
- Dead animals, if any, found within the Sanctuary limits must be examined and autopsied, if need be, to rule out/confirm disease as a mortality cause.
- Suspicious Dead Bird samples may be referred to National Institute of Virology, Pune for assessment.
- Necessary information and cautionary advice be given to people who enter forested areas during outbreak of zoonotic diseases like KFD.
- Vaccination drive for local population wherever possible as incase of KFD will help.

9.3 Training

A PA Manager must be in the knowing of many domains of knowledge to holistically manage the range and its endowments; as such adequate training in different domains is an integral part of any management. Management and Planning of PA is a complex technical task drawing liberally from areas of Geology, Botany, Forestry, Zoology, Landscape Architecture, Soil Chemistry, nutritive value of fodder, wildlife diseases, ecotourism, sociology, business and of course soft skills to deal with people.

As such all these can be acquired only through specialized training, formal and informal. The staff must be regularly sent for training

commensurate with their responsibilities to organizations and Institutions within the state and outside.

Adequate specialized skills in Tranquilization Darting, Capture and translocation etc. must be imparted at the designated Institutes like WII, Dehradun. The staff must also get trained in basics of Check dam construction, GPS recording, Communications, Use of weapon for crime deterrence, collection of evidence, tracking animals based on indirect evidences, census operations, wildlife health monitoring, conflict resolution, Law Enforcement etc. The DCF (WL&ET) North must plan and offer such Training Sessions regularly to enhance competence and build capacity of the staff.

9.3.1 On the Job Training and Establishing a Learning Centre

The training modules should be appropriate to the trainee's functional role, ability to comprehend information, and usefulness of the information and skills imparted to enhance professional out put of the trainee.

The requisite facilities for training can be established by way of a 'Learning Centre' setup of the Forest department at Valpoi to optimize resources and cost of training. The officers of the RFO rank must be deputed to WII, Dehradun or any allied facility in the country for 'Refresher course in Wildlife Management' once every 3 to 5 years to raise their competence for effective and modern management.

On the Job training for Beat Guards, Foresters and RFO is crucial in certain areas, and these staff is the key to effective protection and management of wildlife in any Protected Area. Enthusiastic youth with good communication skills from the local community can be selected and trained to serve as 'Eco-tourist Guides',

A few priority areas where the training could focus on areas follows:

1. Basic understanding of Law pertaining to Wildlife Protection,

Crime and Prosecution.

2. Evidence collection at Crime scene and its interpretation.
3. Wildlife Health Surveillance and Remote Monitoring.
4. Capture and release of wildlife for rescue and conflict mitigation and management.
5. Wildlife enumeration.
6. Nature Interpretation and Education.
7. Ecotourism and Visitor Management.
8. Basic ecology
9. Basic Budgeting and accounts
10. Eco-development

Some research areas that could be prioritized for investigation areas follows:

1. A comprehensive listing of Madei Wildlife sanctuary's Biodiversity. (Currently only a few groups have been listed and much awaits to be documented such as Entomofauna, Fresh water and terrestrial Malacofauna, Arachnofauna, Herpetofauna etc.)
2. Human-Wildlife conflict Interface and mitigation in the villages that come in Zone of influence.
3. Study of Lesser-Known animals of the Madei Wildlife sanctuary.
4. Inventory of Crepuscular and nocturnal fauna of the Madei Wildlife sanctuary.
5. Surveillance of wildlife diseases in Madei Wildlife sanctuary.
6. Medicinal flora of the Madei Wildlife sanctuary.
7. Carrying capacity of Visitors on Madei WLS Trails.
8. Fresh water algae of ephemeral ponds at Madei Wildlife sanctuary.
9. Traditional Ecological Knowledge Systems of the tribal communities of Madei.
10. Study of wildlife corridors with adjacent Kali Tiger reserve of Karnataka and Mollem WLS of Goa.

CHAPTER 10

ORGANIZATION AND ADMINISTRATION

10.1 STRUCTURE AND REPOSNSIBILITIES

In any system, effective implementation of a management plan demands change in the organizational structure, amenities and appropriate budgetary provision. It is difficult to step out of an established system and usher in change overnight, thus any reforms must be gradual, progressive and time bound. It takes a little effort to convince all concern in a system to contribute to the envisioned change as also fall in line with it; hence action should always be a sequel to information. The officer In Charge at the apex hierarchy must take his colleagues and subordinates into confidence, by convincing them of the advantages of the proposed change rather than arbitrarily and unilaterally enforce it.

The implementation of the management Plan too is not different from the bottlenecks discussed above, and a consensus must be built through a dialogue at various levels of hierarchy and the system. The vision must be clearly and unambiguously communicated to solicit enthusiastic concurrence and participation at all levels of the organization.

10.1.1. PRESENT SET UP:

The sanctuary was declared in the year 1999 and the final notification for an area of 44.27 Sq kms only was issued in the year 1999 and rest area of 164.21 Sq. kms is still under process. Before the area was converted into a protected area, it was a Reserved Forest under Valpoi range of North Goa territorial division. In the year 2011, The Madei WLS was transferred under the control of DCF, Wildlife & Eco Tourism Division (North). The staff strength has

been less than the requirement owing to which the management finds it difficult to administer the sanctuary effectively. The following paragraph explains this deficiency in detail and the reasoning behind the proposed staff strength. Currently the Madei Wildlife sanctuary has the following hierarchy structure.

The Wildlife Protected areas are under direct control of Chief Wildlife Warden of the state who is assisted by Conservator of Forests, A senior IFS officer in the rank of DCF is the Deputy Conservator of Forests (WL&ET) (North Goa) Division, who oversees the sanctuary management with the assistance of the staff as outlined in the organizational chart. The DCF is assisted in this task by the Assistant Conservator of Forests ACF (WL&ET). The Madei WLS office is headed by the Range Forest Officer RFO (Madei), and is responsible for the day-to-day administration and management of the sanctuary along with 16 Beat Forest Guards, besides TSL staff at the Ecotourism complex and for other tasks at the Maloli Complex etc. Additionally, during certain seasons labourers are engaged for various other works such as construction and repairs of gabions, Bandharas, Check-dams, de-weeding, management of Fire-lines, etc. During the drier months from December to May, fire watchers are engaged additionally

The organization set up of the Sanctuary is deliberated in detail in chapter 3.4.4. A brief outline of the structure is furnished here.



Madei Wildlife Sanctuary, Goa

CHIEF WILDLIFE WARDEN



CONSERVATOR OF FORESTS (WL)



DCF

North Goa- WL&ET Division



ACF



RFO,



Round Forester,



**Forest Beat Guards,
Madei WLS**

**TSL , Daily wage
Workers**

Organization Chart of Madei Wildlife Sanctuary

10.1.2 PROPOSED STAFF PATTERN:

Vision: *“Upgrading the existing facilities in the Sanctuary to meet the challenges of biodiversity conservation and effective protection of the Sanctuary”*

The total area of the sanctuary is 208.48 sq. km. The Range Forest Officer, Madei wildlife range is in charge of the sanctuary. The sanctuary is divided into 16 beats and 3 rounds and each beat having an area of approximately 10 sq. km. Since the area is highly steep and is covered with dense forests, more than 10 square kilometer is very difficult to perambulate on a regular basis. For successful implementation of the Management Plan and optimal administrative output, the Madei WLS range requires filling the vacant post of the Dy. RFO and also making provision for 5 posts of Round Foresters, as currently there are 3 big Rounds in the range which needs to be bifurcated into 5 rounds. Apart from this there should be one forester and one guard for Maloli Eco tourism Complex to supervise the eco-tourism activities. Additional, 11 Forest guards are essential for manning Check Gates / Patrolling Squad / APC etc, the Proposed Staff Structure for management of Madei Wildlife Sanctuary is given in **Annexure XXV**.

Reorganization of Rounds and Beats to be prepared and submitted to the higher officers for sanction accordingly.

Table no.10: Proposed list of Beat, Round & Range for reorganization

Sr. No	Range	Existing Round	Beat	Round proposed after reorganization
1	Madei Range	Charaundem	Surla	Surla
			Gullulem	
			Ivrem	Charaundem
			Pale	
		Codal	Satrem	Codal
			Codal	
			Derodem	
			Nanorem	
			Vaiguinim	
			Codval	Pendral
		Caranzol	Pendral	
			Caranzol I	
			Caranzol II	Caranzol
			Caranzol III	
			Caranzol IV	
			Assodem	

10.2 STAFF AMENITIES:

Field staff of the sanctuary work with numerous constraints, they remain in deep forests fighting against all odds like inclement weather, confronting wild animals, possible encounters with poachers, various diseases such as malaria, diarrhea etc. They have to regularly patrol the sanctuary both day and night mostly on foot in the tough terrain with abundant leeches and ticks. One of the basic requirements for effective management is to keep the field staff motivated for contributing to the cause of conservation of the sanctuary.

Some of the basic amenities required to be provided to field staff are:

- Supply of uniforms and jungle boots in time.
- Provision of Field Uniforms, Shoes, raincoats, and pullover at regular interval.
- Provision for regular supply of torches and batteries.
- Safe drinking facility such as water filters.
- Regular supply of groceries, Gas Cylinder and hurricane lamps and solar lamps in the camps.
- Supply of basic living articles such as cots, blankets, chairs, tables etc in the camps.

Besides these, some important amenities required to be provided for the betterment of field staff and to make them enthusiastic towards their daily strenuous work and these are:

- Regular health check up

(a) Range Office building:

- There is only one existing office building at Maloli which is the headquarter of the Sanctuary. Hence, one new office buildings at Thane and 3 new round offices are to be constructed in this plan period.
- The forest station building at Codal/ Valpoi is very old and damaged.

10.2.1 Stay facilities for Staff:

The government must incentivize the forest brigade operations in hostile terrain by providing necessary basic facilities to the field staff. Presently, there are no A - Type or B- Type residential Quarters at Madei WLS. Also, there are very old 4 Quarters at Valpoi, Caranzol, Nagargao & Codal; though not in a habitable condition. These dilapidated structures must be repaired and renovated for occupancy by the staff that often travels to their workplace from far away distance.

Since most of the beats are water-scarce, a few Bore wells could be dug operated with a Solar Pump near the Patrolling Stations after assessment and permissions. On an average 4 Solar Pumps per Beat could be optimal. Currently there is no electricity at the Patrolling stations and Solar Panels often go defunct during the wet season as the sanctuary receives large volumes of rain during the S W Monsoons. Also, Toilets must be provided in the Patrolling stations throughout the Range.

In view of the reorganization and posting of more number of staff, some more quarters are required. Anti poaching camps are usually run in temporary / semi-permanent sheds. The patrolling tracks have been provided with gates in sensitive areas. No patrolling track is allowed to be kept in open condition. There are four number of permanent watch tower erected in different parts of the sanctuary. A basic network of tracks has been developed utilizing and inter connecting the existing village roads. All these village roads are meant to be patrolling track cum permanent fire breaks. Infrastructure required in the next 10 years is furnished here under: -

Table No 11: List of Quarters Proposed During The Plan Period

Sr. No	Range	Required buildings/ quarters	Place
1	Madei	RFO quarter (1)	Maloi
		Forester (5)	Codal, Caranzol – 2 Nos ,

			Thane – 2 nos
		Forest Guard	Surla, Thane, Codal, Maloli, Caranzol, Satrem, Assodem, Bondirwada

10.2.2 Anti Poaching Camp:

There are 10 Anti poaching camps which are working as permanent / temporary establishment, at different locations inside the sanctuary. Local youths are employed in these camps along with the permanent staff. But working of these camps is not yet systematized. They are used as support structures to makeup the staff shortages.

10.2.3 Conveyance and communication:

There are a couple of drivers for the range vehicles that comprise of 2 jeeps, 1 Mini Truck and 9 Motorcycles provided to the Beat Guards for the purpose of field surveillance. One vehicle of the Madei range has been fit with Mobile Wireless Set, however, the terrain features here weaken the conventional telecommunication and a robust, modern Wireless communication system should be put in place on priority. Wireless sets (fixed, mobile or walkie-talkies) are indispensable means of communication in the field. A Repeater station need to be established early and all wireless sets are to be maintained in good working condition. Vehicles must be provided with mobile wireless connections. Necessarily, there must be walkie-talkie with all the executive staff upto Forest Guard.

10.2.4 Arms and Weapons for Official purpose:

There have been negligible cases of wildlife crime in the jurisdiction of the Madei Wildlife Sanctuary. None the less for protection from criminals, crime deterrence and law enforcement weapons are necessary. Currently the range has only 1 No. of 9 mm Pistol in the custody of the RFO. Procurement of arms and ammunition to be prioritized.

10.2.5 Enclosure for rescued Animals:

There are no enclosures for rescued birds, reptiles and mammals which can be fortified and used to hold rescued animals before translocation and release. Enclosure for rescued animals need to be prioritized.

10.2.6 Incentives and Rewards:

It is essential to provide staff with incentives/rewards in recognition of extraordinary performance of duty; it encourages others to perform better. The incentives like advance increment, cash award, medals and appreciations etc. can be thought of.

CHAPTER 11:

BUDGET

11.1 The plan budget:

The budgetary provisions made available for the development of the sanctuary so far is very meager with most of the funds being spent mainly on the maintenance of works already executed and other anti-poaching activities. More funds may be provided as per the financial chart for the better management of the sanctuary. The details of budgetary requirements are discussed in the future formats.

The major expenditures for maintenance of the sanctuary are incurred from the fund under following Plan budgets:

- CENTRAL SECTOR: 1) CSS-Integrated Development of Wildlife Habitats (IDWH)
2) CSS – Forest Fire Prevention & Management Scheme (FFPMS)
- STATE SECTOR:
- CAMPA

11.2. Programme of works:

A detailed programme of work indicating the year, location, quantity of work and their financial implications to be furnished yearly.

The programme is broadly divided into six categories as under.

– Regular maintenance works.

- Protection works.
- Habitat protection and management.
- Eco development.
- Eco tourism.
- Infrastructure.

This classification aims at prioritizing different items of work in the order of their importance to the management of the sanctuary. Whenever there is budget constraint, the annual maintenance works should be accorded priority. Programmes like eco development of the buffer areas and rehabilitation of inhabitants require huge commitment of funds and therefore may not be possible under the routine annual programmes. They should be packaged separately as independent projects and sourced appropriately.

The funding to the sanctuary has been very less in the last five years. A major component of the expenditure is for payment of wages of the staff employed in the antipoaching camps, Trekkers, day to day management of sanctuary. Increased funding is required for strengthening of infrastructure, development of eco-tourism, awareness generation and education activities etc.

11.3: Yearly Budget Requirement

The budgetary requirement for the next 10 (ten) years, i.e, from 2024 to 2034 has been categorized as explained in the following paragraph. For calculation purpose, an annual increase of 10% in cost of all the items of expenditure has been considered.

It is anticipated that adequate budgetary resources will be made available under the plan schemes in addition to the normal state and central budget resources. The proposed budget from 2024 to 2034 is furnished in **ANNEXURE- XXVIII.**

11.3.1 ITEMS OF BUDGET COMPONENTS:

A) NON-RECURRING:

1. Infrastructure, Protection and Communication:

- i) Vehicle.
- ii) Cyber and Wireless Communication up-gradation
- iii) Arms and ammunition
- iv) Field equipment such as binoculars, digital cameras, GPS, Drones, UAV, IR/Thermal Cameras etc.
- v) Construction of new quarters/ antipoaching camps for the staff.
- vi) Construction of monitoring towers with advanced technology.
- vii) Improvement of existing camps, Quarters etc.
- viii) Rescue equipment like Cages, Nets and Restraint Poles, Tranquilizing Guns and accessories etc.

2. Protected Area Management:

- i) Survey and demarcation
- ii) Improvement of road network
- iii) Bridges/ Culverts.
- iv) Habitat Improvement works such as desilting of waterholes, check dams etc.
- v) Creation of new fire lines
- vi) Assisted Natural Regeneration
- vii) Grass land Development

3. Eco - Tourism Development:

- i) Establishment of nature camp at Madei. (Surla)
- ii) Creation of nature trails.

- iii) Creation of camping facilities at Surla
- iv) Establishing an interpretation center.

4. Eco-development:

- i) Entry point investment.
- ii) Village Eco-development programme.

5. Research, Monitoring and training

- i) Conducting basic research on the ecological and socio-economic aspects etc.
- ii) Training of staff on legal and other management aspects.
- iii) Training of teachers, school children, villagers etc
- iv) Conducting census of important Wildlife species
- v) Documentation of biodiversity and grant in aid for conducting small time research.

6. Environmental Education

- i) Development and procurement of education material for awareness generation such as pamphlets, brochure, e-fliers, films, documentaries, presentations etc.
- ii) Establishing a library of wildlife books and reference material.
- iii) Erection of boards and signage's at important points
- iv) Development of Educational Audio-Visual Programmes.

B) RECURRING COST:

1. Establishment Cost:

- i) Salaries and allowance.

ii) TA/ Medical.

iii) Office expenses.

2. Maintenance Cost:

i) Maintenance of camps and Buildings.

ii) Maintenance of vehicles.

iii) Maintenance of roads, patrolling paths, bridges/ culverts etc.

iv) Ammunition.

v) Uniform and other staff amenities (Torch, Gas, Solar, Drinking water etc.)

vi) Maintenance of Arms and Wireless net work.

vii) Compensation arising out of man - animal conflict.

viii) Training.

ix) Awareness programme.

x) Staff welfare.

xi) Co-ordination.

xii) Immunisation programme

CHAPTER12

12.1 Schedule:

The expenditure incurred is mainly on habitat improvement, infrastructure development and fire protection. Revenue is mainly from the entry fees for tourist. More emphasis will be provided to protection, habitat improvement, eco-development and eco-tourism and research.

12.2 –Record of deviations and implemented targets:

All the record of deviations are recorded in the control forms obtained from the “Manual for Planning Wildlife Management in Protected areas and Managed Forests” by Sri. Vishwas B. Sawarkar. Range Registers and maintenances of compartment histories will be kept in each range and consolidated at the Division level.

12.3 The Record of Employment Potential:

It is important to know the man-days created in a financial year through different work. This not only gives the employment generated by the sanctuary but also gives the expenditure incurred against each scheme/work in a given month and accordingly the total wage component utilized during the year. The concerned Range Officers should thus maintain a register for such labour generation in different schemes in the Proforma a shown at table below.

Table12: Proforma for Recording Employment Potential

Sl No.	Name of Range	Month	Nature of Work	Total No. of man days generated	Approx. expenditure	Remarks
1	2	3	4	5	6	7

12.4 The Control Forms:

The control forms should be prepared in triplicate by the Range Officers for their respective jurisdiction and submitted to the Deputy Conservator of Forest, Madei WLS. Thereafter, the Deputy Conservator of Forest, shall submit the control forms to the higher authorities in the prescribed format along with his/her comments in the relevant column. The period specified in the code for submission of control forms be strictly adhered.

12.5 Maintenance of Compartment Histories:

Since compartments have been suggested to be formed in this Plan, completion of CH files be ensured as per the detailed forms provided in Annexure-IX. The continuation of data collection will become a normal practice there after. The compartment history is an important document and should be maintained in duplicate. The DCF in-charge of sanctuary will be responsible for compilation and maintaining the compartment history of their respective areas at the beginning of his plan. Besides above, the following other records should also be maintained by the management for better observation, effective monitoring and able research purposes.

(A) Note Book–It is a interesting record of observations and will be helpful at the time of review of management plan. All kind of animal activities like plantation damage, insect attack, epidemic, fire damage, regeneration status, habitat condition set should be recorded in the divisional hand book with dates and address viz. Beat name. This will also act as a ready reckoner of important happenings in sanctuary.

(B) Fire Incidence Report– This register is very important to plan the fire control measures. The record of fire incidences should be recorded in the compartment history also. The amount spent in cleaning and burning of fire lines during the financial year should also be recorded in the fire incidence register.

CHAPTER 12

FORM WM-1

CREATION OF NEW ARTIFICIAL WATERHOLES

Sr. No	Category	Year	Location	Cost	Performance
1	2	3	4	5	6
1	Excavation				

FORM WM-1.1

MAINTENANCE OF WATERHOLES: NATURAL

Sr. No.	Category	Perennial or seasonal	Location	Year	Nature of work	Cost	Performance
1	2	3	4	5	6	7	8
1	Natural	Perennial					

CHAPTER 12

FORM WM - 1.2

MAINTENANCE OF WATERHOLES: ARTIFICIAL

Sr. No.	Category	Perennial or seasonal	Location	Year	Nature of work	Cost	Performance
1	2	3	4	5	6	7	8
1	Artificial	-					-

FORM WM - 2

RESTORATION OF HABITAT: WEED CONTROL, INITIAL OPERATION

Sr. No.	Location and name of site	Year	Extent of area (ha)	Species of weed	Operation	Total cost	Cost per ha	Remarks
1	2	3	4	5	6	7	8	9
1								
2								

CHAPTER 12

FORM WM - 2.1

RESTORATION OF HABITAT: WEED CONTROL, SUBSEQUENT OPERATIONS

Sr. No.	Location and name of site	Year	Extent of area (ha)	Complete or partial coverage	Species of weed	Operation	Total cost	Cost per ha	Remark
1	2	3	4	5	6	7	8	9	10
1									

FORM WM - 2.2

RESTORATION OF HABITAT: CONTROL OF REGENERATION OF WOODY SPECIES IN GRASSLANDS

Sr. No.	Location & name of site	Year	Extent of area (ha)	Species controlled	Operation	Total cost	Cost per (ha)	Remarks
1	2	3	4	5	6	7	8	9
1								
2								

CHAPTER 12

FORM WM - 2.3

RESTORATION OF HABITAT: PRESCRIBED BURNING

Sr. No.	Location & name of site	Year	Extent of area (ha)	Area treated (ha)	Period	Total cost	Cost per (ha)	Remarks
1	2	3	4	5	6	7	8	9
1								

FORM WM - 2.4

RESTORATION OF HABITAT: SOIL CONSERVATION MEASURES - INITIAL OPERATIONS AND SUBSEQUENT MAINTENANCE

Check dams

Sr. No.	Location & name of site	Year	Extent of area (ha)	Area treated (ha)	Operations	Total cost	Cost per (ha)	Remarks
1	2	3	4	5	6	7	8	9
1								
2								

CHAPTER 12

FORM WM - 2.5

RESTORATION OF HABITAT: PLANTING, SOWING - INITIAL OPERATION

Sr. No.	Location	Year	Extent of area (ha)	Species	Planting stock	Spacing	Operations	Total cost	Cost per ha	Remarks
1	2	3	4	5	6	7	8	9	10	11
1										

FORM WM - 2.6

RESTORATION OF HABITAT: RESPONSE OF PLANTINGS, SOWINGS AND SUBSEQUENT OPERATIONS

Sr. No.	Location	Year	Extent of area (ha)	Species	Survival %	Casualty replacement	Operations	Total cost	Cost per ha	Remarks
1	2	3	4	5	6	7	8	9	10	11
1										
2										

CHAPTER 12

FORM WM - 2.7

RESTORATION OF HABITAT: AREA UNDER PROTECTION/CLOSURE

Sr.No.	Location	Year	Extent of area (ha)	Description of site	Regulation or protection measures	Response	Remarks
1	2	3	4	5	6	7	8
1							
2							

FORM WM - 3

ANIMALS: MEASURING TRENDS IN POPULATIONS (YEAR)

Year:

Sr. No.	Species	Population estimation Methodology	Adult		Sub- adult		Yearlings	Fawns	Cubs	Total	Remark
			Male	Female	Male	Female					
1	2	3	4	5	6	7	8	9	10	11	12
1											

CHAPTER 12

FORM WM - 3.1

ANIMALS: NEW RECORDS

Year:

Sr. No.	Species	Location	Year	How discovered	Details of number, age, sex	Habitat description	Remarks
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	

FORM WM - 3.2

ANIMALS: MORTALITY OTHER THAN THAT ATTRIBUTABLE TO AN OFFENCE

Year:

Sr. No.	Species	Location	Year	Sex and age	Number	Discovered in what condition	Cause of mortality	Remarks
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	-

CHAPTER 12

FORM WM - 3.3

ANIMALS: MORTALITY ATTRIBUTED TO POACHING OR AN ACT OF VANDALISM

Year:

Sr. No.	Species	Location	Cause of mortality				Remarks
			Number	Sex	age	Class	
1	2	3	4				5
-	-	-	-	-	-	-	

FORM WM - 3.4

ANIMALS: PREDATION ON DOMESTIC LIVESTOCK BY WILD CARNIVORES

Year:

Sr.No.	Range	Month	Category of livestock killed	Location	Numbers	Ex gratia Payment(Rs)	Carnivore involved	No. of cases undecided	Remarks
1	2	3	4	5	6	7	8	9	10
-	-	-	-	-	-	-	-	-	

CHAPTER 12

FORM WM - 3.5

ANIMALS: KILLING OF A HUMAN BY WILDLIFE OR INJURY CAUSED

Year:

Sr. No	Range	Month	No. of incidents	No. of people killed, age & sex	Location circumstance & species	No. of people injured, age and sex	Location circumstance and species	Ex gratia Payment (Rs)
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

FORM WM - 3.6

ANIMALS: WILDLIFE DAMAGE TO PRIVATE OR PUBLIC PROPERTY

Year:

Sr. No	Range	Month	The category of property	Extent of damage	Species involved and number	Remark
1	2	3	4	5	6	7
-	-	-	--	-	-	-

CHAPTER 12

FORM WM - 4

PLANTS: NEW RECORDS

Sr. No	Family	Species	Year	Location	Habitat	Status	Remark
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	-

FORM WM - 4.1

PLANTS: DISEASE AND MORTALITY

Sr. No.	Species	Location	Year	Particulars of disease morbidity and mortality	Area affected	Remark
1	2	3	4	5	6	7
-	-	-	-	-	-	-

FORM WM - 4.2

PLANTS: ILLEGAL AND LEGAL COLLECTION

Sr. No.	Year	Species	Location	Details of material	Quantity	Trade particular	Remarks
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	-

CHAPTER 12

FORM WM - 4.3

TIMBER OUT-TURN AND REVENUE

YEAR

Sr. No.	Range	Timber Species	Volume extracted amt in grade	Volume auctioned amt in grade	Amount (Rs)	Price/cmt/(Rs) grade	Unauctioned Volume cmt in grade
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	-

FORM WM - 4.4

FIREWOOD OUT-TURN AND REVENUE

YEAR AND DEPOT

Sr. no.	Range	Firewood species	Volume extracted cmt.	Volume auctioned cmt.	Amount (Rs)	Price/cmt(Rs)	Disposal pattern of firewood in cmt.	
							Local	Other areas
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	-

Note: - No commercial felling of trees as per the law.

CHAPTER 12

FORM WM - 4.5

OUT-TURN OF CHARCOAL AND REVENUE

YEAR AND DEPOT

Sr. No.	Range	Species used	Volume tonnes	Converted charcoal quantity tonnes	Conversion factor	Quantity sold	Total amount per ton (Rs)	Disposal pattern in tonnes	
								Local	Other area
1	2	3	4	5	6	7	8	9	10
-	-	-	-	-	-	-	-	-	-

Note: - No commercial felling of trees as per the law.

FORM WM - 4.6

Extraction of bamboo and disposal

Year

Sr. No	Range	Species	Quantity extracted by category		Disposal, non- commercial by quantity		Revenue realized (Rs)		Undisposed quantity	
			Commertia l	Non- commercial	Locally	Other areas	commerci al	Non commercial	Commertia l	Non- commercial
1	2	3	4	5	6	7	8	9	10	11
-	-	-	-	-	-	-	-	-	-	-

CHAPTER 12

FORM WM - 4.7

DISTRIBUTION OF FOREST PRODUCE UNDER NISTAR AND OTHER CONCESSIONS INCLUDING FREE GRANT

YEAR

Sr.No.	Range	Produce	Species	Quantity	village	No. of families	Revenue	Free of change qty.
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

FORM WM - 4.8

NWP COLLECTION: PLANTS AND OTHER PRODUCE

YEAR

Sr No.	Range	Kind of produce	Species	Quantity	Revenue realised	Free change quantity	Agency involved	
							Local people	Outsiders
1	2	3	4	5	6	7	8	
-	-	-	-	-	-	-	-	

Note: - Harvesting of plants and other produce is prohibited as per law.

CHAPTER 12

FORM WM - 5

GRAZING OF DOMESTIC LIVESTOCK

YEAR

Sr. No.	Grazing unit No.	List of villages in the unit	Village- wise listed population of cattle	Capacity of the unit (cattle units) and number of cattle grazing	Total cattle units grazed		Remark
					Legal	Illegal	
1	2	3	4	5	6		7
-	-	-	-	-	-		-

Note: - No record available.

FORM WM - 6

INTER-AGENCY PROGRAMMES: AGENCIES AND SCHEMES (GOVERNMENT)

YEAR

Sr. No.	Name of agency	Central or State	Number and name of scheme operated	Physical and financial targets		Area & location	Remarks
				Given	Achieved		
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	

Note: - No record available.

CHAPTER 12

FORM WM - 6.1 PROGRAMMES OF NGOS

YEAR

Sr.No	Name of agency	HQ location	Nature of the scheme operated	Physical/financial targets		Area and location	Remarks
				Given	Achieved		
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	

Note: - As per the availability of speaker and funds.

FORM WM - 7 CONSTRUCTION*/MAINTENANCE* OF INFRASTRUCTURE: ROADS & BRIDGES (*EXISTING/NEW)

YEAR: 2021-22 to 2030-31

Sr. No.	Category	Range	Surface	Name or number	Length covered (km)	Cross drainage works bridges or culverts with types	Total cost and status
1	2	3	4	5	6	7	8
1							

CHAPTER 12

FORM WM - 7.1

CONSTRUCTION*/MAINTENANCE* OF INFRASTRUCTURE: BUILDINGS (*EXISTING/NEW)

YEAR: 2021-22 to 2030-31

Sr. No.	Range	Nature of the building	Location	Types of construction	Numbers	Total cost	status
1	2	3	4	5	6	7	8
1							
2							
3							
4							
5							
6							
7							
8							
9							

CHAPTER 12

10							
11							
12							
13							
14							
15							
16							

FORM WM - 7.2**DEVELOPMENT*/MAINTENANCE* OF INFRASTRUCTURE: COMMUNICATION (*EXISTING/NEW)****YEAR 2021-22 to 2030-31**

Sr. No.	Range	Type of facility	Location	Numbers	cost	Advantage gained	Remarks
1	2	3	4	5	6	7	8

CHAPTER 12

FORM WM - 7.3

DEVELOPMENT*/MAINTENANCE* OF INFRASTRUCTURE: VEHICLES (*EXISTING/NEW)

YEAR 2021-22

Sr. No.	Kind of vehicle	Number	HQ if any	Intended use	Cost	Remarks
1	2	3	4	5	6	7

FORM WM - 7.4

DEVELOPMENT OF INFRASTRUCTURE: MANPOWER RECRUITMENT*/EXISTING MANPOWER*

YEAR 2021-22 to 2030-31

Sr. No.	Category of post	Number	Status		Scale pay	Intended Deployment/deployed as	Remarks
			Recruited	Vacant			
1	2	3	4	5	6	7	8
1							
2							
3							

CHAPTER 12

FORM WM - 7.5

DEVELOPING INFRASTRUCTURE: CONSTRUCTION OF BOUNDARIES, FENCES, CPTS, EPTS, ENCLOSURES, ENCLOSURES (*EXISTING/NEW)

YEAR 2021-22 to 2030-31

Sr. No.	Category of construction	Range	Location	Length(meter)	Numbers	Specification	Remarks
1	2	3	4	5	6	7	8
1							

FORM WM - 7.6

DEVELOPING INFRASTRUCTURE: FIRELINES (*EXISTING/NEW)

YEAR 2021-22 to 2030-31

Sr. no.	Range	Fire category and width	Name of points connected	Length (meters)	Cost	Remarks
1	2	3	4	5	6	7
1						
2						

CHAPTER 12

FORM WM - 8

TOURISM YEAR

Total number of visitors all categories: - 1402 nos.

Name of complex: -

Total revenue earned: 28040.00 (2019-2020)

Sr. No.	The category of visitors by month & number					Indian			No. day visitors	No. staying overnight and revenue
	Adult			children	Foreigners	Rural	Urban	Revenue		
	Month	Male	Female							
1	2	3	4	5	6	7	8	9	10	11
1										
2										
3										
4										
5										
6										
7										
8										

CHAPTER 12

9										
10										
11										
12										
	Total									

FORM WM - 8**TOURISM YEAR**

Total number of visitors all categories: - 79,331 nos.

Name of complex: - Arannyak Zoo.

Total revenue earned: 46, 12,105/- (2019-2020)

Sr. No.	The category of visitors by month & number					Indian			No. day visitors	No. staying overnight And revenue
	Adult			children	Foreigners	Rural	Urban	Revenue		
	Month	Male	Female							
1	2	3	4	5	6	7	8	9	10	11
1										

CHAPTER 12

2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
	Total									

CHAPTER 12

FORM WM - 8.1

TOURISM: USE OF TOURIST FACILITIES - LODGING

YEAR: 2019-2020

Name of complex:

Class of accommodation:

Capacity (beds): 02 beds for each room.

Sr. No.	Month	Month capacity (beds/month)	Occupancy (beds/month)		Total occupancy During the month(beds/month)
			Foreign	Indian	
1	2	3	4	5	6
1					
2					
3					
4					
5					
6					
7					
8					

CHAPTER 12

9					
10					
11					
12					

Note: - The total number of visitors for next few year cannot be defined, however annual increase of 10% may be consider.

FORM WM - 8.2**TOURISM: USE OF TOURIST FACILITIES - FIELD TRIPS****YEAR**

Name of complex: - Bondla

Sr. No.	Month	Riding elephant use. Month trip capacity	Utilisation	Revenue (Rs)	Use of PA bus/es. Month trip capacity	Utilisation	Revenue (Rs)	Use of month trip quantum	Guides utilisation	Revenue (Rs)
1	2	3	4	5	6	7	8	9	10	11
-	-	-	-	-	-	-	-	-	-	-

CHAPTER 12

FORM WM - 8.3

ECO-TOURISM - PARTNERS

YEAR

Sr. No.	Identity of eco-tourism entrepreneur	Infrastructure	Programmes	Investment	Kind and extent of benefits to local people	Benefit to PA & resources
1	2	3	4	5	6	7
-	-	-	-	-	-	

Note: - NIL.

FORM WM - 8.4 (A) & (B)

ECO-TOURISM: VISITOR ASPIRATIONS

YEAR

Visitor category	No.	Interested in									
Adult Male		Plants	Bird watching	Animal sighting	Photography	Sketching	Scenic place	Cultural /historical	Pilgrimage	Trekking	Other

CHAPTER 12

Female Children								1 sites			
Foreigner Male Female Children											
1	2	3	4	5	6	7	8	9	10	11	12

Note: - No record available.

FORM WM - 9

OUTBREAK OF FIRES

YEAR

Sr. No.	Range	Location	Extent (ha)	Dates		Reasons	Estimated loss	Remarks
				Detected	controlled			

CHAPTER 12

1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

Note: - No record available.

FORM WM - 10**OFFENCE CASES DETECTED****YEAR**

Sr. No.	Range	Category	Numbers	Number of cases decided		Number of cases under process	Number cases compounded	Remarks
				Successful	Failure			
1	2	3	4	5	6	7	8	9
1			01	01	-	-	01	

CHAPTER 12**FORM WM - 11****INCENTIVES AND REWARDS/AWARDS****YEAR**

Sr. No.	Range	Number of recipients : incentives/reward for detecting offences	No. of recipients for award for outstanding service	Kind of award	Number of recipients	Remarks
1	2	3	4	5	6	7
-	-	-	-	-	-	

Note: - No record available.**FORM WM - 12****RESEARCH PROJECTS UNDER IMPLEMENTATION THROUGH PA MANPOWER WITH OR WITHOUT
COLLABORATION WITH OTHER AGENCIES****YEAR**

Sr. No.	Title	Completed	Ongoing	New	Status	Financial outlay (Rs)	Expenditure incurred (Rs)	Remarks
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

Note: - No record available.

CHAPTER 12

FORM WM - 12.1

RESEARCH PROJECTS UNDER IMPLEMENTATION BY OTHER AGENCIES

YEAR

Sr. No.	Title	Completed	Ongoing	New	Status	Financial outlay (Rs)	Expenditure incurred (Rs)	Remarks
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

Note: - No record available.

FORM WM - 13

SURVEY AND INVENTORIES

YEAR

Sr. No.	Title of survey, inventory activity	Completed	Ongoing	New	By PA	By other agency	Remarks
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	

CHAPTER 12

FORM WM - 14

THE MONITORING PROGRAMME

YEAR

Sr. No.	Title of the programme	Date of initiation	Responsible agency	Technique	Status of collaboration and analysis of data	Remarks
1	2	3	4	5	6	7
-	-	-	-	-	-	

FORM WM - 15

ECO-DEVELOPMENT PROGRAMME: TARGETS AND IMPLEMENTATION

YEAR

Sr. No.	Nature of the programme	Sector (Central/State) or NGO sponsored	Target set		Achievements		Village (Buffer/enclaved)	Remarks
			Physical	Physical	Physical	Financial		
1	2	3	4	5	6	7	8	9
1								

CHAPTER 12

FORM WM - 16

PROGRESS OF ALL STRATEGIES UNDER THE ZONE AND THEME PLANS

YEAR

Sr. No.	Zone/Theme	Nature of strategy	Target as per the schedule of operations/APO*		Achievement		Location	Remarks
			Physical	Financial	Physical	Financial		
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

FORM WM - 17

PROGRESS OF LEGAL SETTLEMENTS UNDER THE WILDLIFE (PROTECTION) ACT 1972 IN CONTEXT OF ATTAINMENT OF THE STATUS OF A WLS/NP

YEAR

Sr. No.	Nature of settlement/ enquiry & section under the Act	Progress achieved till the commencement of the year under report	Progress achieved during the year	Remarks
1	2	3	4	5
-	-	-	-	-

CHAPTER 12

FORM WM - 18

A SUMMARY OF ALLOTMENT OF FUNDS, REVENUE AND EXPENDITURE

YEAR

Sr. No.	Plan/non-plan/ any other grant	Sector Central/State/other	Allotment received		Expenditure Incurred		Revenue realised	Remarks
			Non-recurrent	Recurrent	Non-recurrent	Recurrent		
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

FORM LS - 1

EXISTING CORRIDORS - CONSERVATION INPUTS REQUIRED

Sr. No.	Identity of the corridor	Length/ section	Nature of Inputs/treatment	Target	Agency/cies identified	Constraints	Anticipated investment
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	

CHAPTER 12

FORM LS - 2

EXISTING CORRIDORS - CONSERVATION INPUTS ACCOMPLISHED

Sr. No.	Identity of the corridor	Length/section addressed	Nature of Inputs/treatment	Agency	Target set	Achievement	Constraints	Investment	Remarks
1	2	3	4	5	6	7	8	9	10
-	-	-	-	-	-	-	-	-	

FORM LS - 3

EXISTING CORRIDORS - MONITORING HABITAT RECOVERY

Sr. No.	Identity of the corridor	Length/section monitored	Inputs/treatment that had been provided	Monitoring technique/process	Indicators of recovery	Nature of progress	Constraints	Remarks
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

CHAPTER 12

FORM LS - 4

POTENTIAL CORRIDORS - CONSERVATION INPUTS REQUIRED

Sr. No.	Identity of the corridor	Length/section	Nature of inputs/treatment	Target	Agency/cies identifies	Constraints	Anticipated investment
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	

FORM LS - 5

POTENTIAL CORRIDORS - CONSERVATION INPUTS ACCOMPLISHED

YEAR

Sr. No.	Identity of the corridor	Length/section addressed	Nature of inputs/treatment	Agency	Target set	Achievements	Constraints	Investment	Remarks
1	2	3	4	5	6	7	8	9	10
-	-	-	-	-	-	-	-	-	

CHAPTER 12

FORM LS - 6

POTENTIAL CORRIDORS - MONITORING HABITAT RECOVERY

YEAR

Sr. No.	Identity of the corridor	Length /section monitored	Inputs/treatment that had been provided	Monitoring technique /process	Indicators of recovery	Nature of progress	Constraints	Remarks
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

FORM LS - 7

CONNECTING MULTI-AGENCY PROGRAMS IN LANDSCAPE BASED PLANNING

PARTNERS DURING YEAR:

Sr. No.	District	Sector Central/ State/Other (specify)	Agency & Work area/speciality	Program coverage	Agreed input and mechanism	Financial implications /investment & source
1	2	3	4	5	6	7
-	-	-	-	-	-	

CHAPTER 12

FORM LS - 8

MONITORING EXTENT AND QUALITY OF MULTI-AGENCY PROGRAMS

YEAR

Sr. No .	District	Sector/Central/State / Other (specify)	Agency	Objectives & targets	Achievement and standard	Constraints	Extent of investment	Remarks
1	2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-	

12.5 Maintenance of Compartment Histories

NA

12.6 A Pocket Field Guide for Plan Implementation

NA

ANNEXURES

ANNEXURE-I

The Official Gazette Notification of Madei Wildlife Sanctuary.

REGD. GOA - 5

Panaji, 3rd June, 1999 (Jyaishta 13, 1921)

SERIES I No. 10

OFFICIAL GAZETTE



GOVERNMENT OF GOA

EXTRAORDINARY

GOVERNMENT OF GOA

Department of Forest

Notification

2-333-99-FD/A-Part/940

Whereas, the Government of Goa considers the area comprised within the reserve forests, specified in the Schedule hereto is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance for the purpose of protecting, propagating or developing wildlife or its environment (hereinafter called the "said area").

Now, therefore, in exercise of the powers conferred by sub-section (b) of section 26A of the Wildlife Protection Act, 1972 (Central Act 53 of 1972), the Government of Goa hereby declares the said area as a sanctuary for the purposes of the said Act.

SCHEDULE

Name: Madei Wild Life Sanctuary.

Area: 44.27 sq. kms.

The areas comprising of the reserve forests of Valpoi range falling within the village limits of Assodem, Codval, Suria, Vainguinim, Zaranim and also comprising of the reserve forests in Keri range falling within the village limits of Dongurli and delimited by the boundaries mentioned below.

Boundaries:-

Eastern boundary — State boundary of Goa;

Northern boundary — State boundary of Goa;

Southern boundary — Northern boundary of Bhagwan Mahaveer Wildlife Sanctuary and southern border of Assodem;

Western boundary — The western boundaries of Assodem and Dongurli.

By order and in the name of the Governor of Goa.

Richard D'Souza, Conservator of Forests & Ex-Officio Addl. Secretary.

Panaji, 31st May, 1999.

Notification

2-333-99-FD/A-Part/941

Whereas, the Government of Goa considers that the area specified in the schedule hereto is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance for the purpose of protecting, propagating or developing wildlife or its environment (hereinafter called the "said area").

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 18 of the Wildlife (Protection) Act, 1972 (Central Act 53 of 1972), the Government of Goa hereby declares its intention to constitute the said area a sanctuary for the purposes of the said Act.

SCHEDULE

Name: Madei Wild Life Sanctuary.

Area: 164.21 sq. kms.

The areas comprising of the forests of Valpoi range falling within the village limits of Caranzol, Codal, Carambolim Brama, Compordem, Choraundem, Derodem Dabem, Dabem 2,

Govanem, Golanli, Irve Buzzuroco, Maloli, Pale, Nanorem, Pendrai, Satrem, Sirsodem, Siranguli, Sigonem, Xelpe Buzzuroco, Zormem, and also comprising of forests in Keri range falling within the village limits of Gullullem, Ivre Curdo, Kelandem and delimited by the boundaries mentioned below:—

Boundaries:-

- Eastern Boundary** — Runs along the eastern boundary of villages Satrem and Derodem along the Goa-Karnataka border and then along the northern boundary of Vaingim and western boundary of Zarani and then along the south-western boundary of Codval upto the Goa-Karnataka border then going along and meeting the northern border of Bhagwan Mahaveer Wildlife Sanctuary.
- Northern boundary** — Runs along the northern boundary of village Satrem along the Goa-Karnataka border then along the western and southern boundary of Surla and then along the eastern boundary of Golauli to touch the Goa-Karnataka border and then runs along the State boundary of Goa upto Kelaudem.
- Southern boundary** — The northern boundary of Bhagwan Mahaveer Wildlife Sanctuary and the southern boundary of Govane.
- Western boundary** — Runs along the western boundaries of the following villages in a south to north direction - Gavane, Sirsode, Siranguli, Caranzol, then along the banks of the Mahadayi river upto the western boundary of Carambolim Brama, Xelopo Buzzuroco, Sigonem, Codal, and then going along the southern boundaries of villages Golauli, Ivre curdo, Ivre buzuroco, Choraudem and then going along the eastern boundary of Pale, Compordem and then goes along the western boundary of Compordem, southern and eastern boundary of Zorme and then eastern, southern and western boundary of Dabem along the western boundary of Zorme and western and northern boundary of Gullullem. Then joining the western boundary of Charaudem and going along the southern boundary of Kelaudem upto the State border of Goa.

By order and in the name of the Governor of Goa.

Richard D'Souza, Conservator of Forests & Ex-Officio
Addl. Secretary.

Panaji, 31st May, 1999.

Notification

2-335-99-FD/A-Part/964

Whereas, the Government of Goa considers that the area specified in the schedule hereto is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance for the purpose of protecting, propagating or developing wildlife or its environment (hereinafter called the "said area").

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 18 of the Wildlife (Protection) Act, 1972 (Central Act 53 of 1972), the Government of Goa hereby declares its intention to constitute the said area as a sanctuary for the purposes of the said Act.

SCHEDULE

Name: Netravali Wild Life Sanctuary.

Area: 154.82 sq. kms.

The areas comprising of the forests of Sanguem range, falling within the village limits of Patiém, Tudov, Potrem, Bati (Talaui Dongor), Bati (Vagpad), Cumbari, Viliena, Portem, Viliena 2, Salauli and also comprising of forests in Curdi range falling within the village limits of Verlem, Mangal, Nundem, Curdi, Netorli 1, Netorli 2, Portem and delimited by the boundaries mentioned below:—

Boundaries:-

- Eastern boundary** — State boundary of Goa along the eastern border of Patiém, Tudov, Potrem, Bati, and then along the northern border of Cumbari, and western borders of Cumbari, Naiquinim, Sigonem and then along the southern border of Sigonem touching the State boundary of Goa and upto the Cotigao Wildlife Sanctuary.
- Northern boundary** — Southern boundary of Bhagwan Mahaveer Wildlife Sanctuary running across the northern boundary of Patiém.
- Southern boundary** — The northern boundary of Cotigao Wildlife Sanctuary and along the southern boundaries of Verlem, Nundem and Mangal.
- Western boundary** — Runs along the western boundaries of the following villages in a south to north direction — Mangal, Netorli, Portem, and then Curdi, Salauli, Tudou, Patiém and then joins the southern boundary of Bhagwan Mahaveer Wildlife Sanctuary.

By order and in the name of the Governor of Goa.

Richard D'Souza, Conservator of Forests & Ex-Officio
Addl. Secretary.

Panaji, 1st June, 1999.

ANNEXURE-II

Village wise details of Reserve Forest notifications declared under Sec. 4 & Sec. 20 of Indian Forest Act 1927 at Madei WLS limits

Sr. No.	Village	Survey Nos.	Name of Forest	Status	
				Sec 4 Gazette No. & date	Sec 20 Gazette No & date
1.	Gululem	3,4,5,7 to 17,27 to 34,51,52,53,57,58,59,61, to 71,73,74,75,79, 80,81,82,84,85	Gululem	31 Sr. III 30.10.80	-
2.	Dongurli (Tanem)	15 & 18	Dongurli (Tanem)	-	16 Sr. III 19.7.97
3.	Ivrem Curdo	2pt,3,4,5,6,8pt,9,10, 11pt,12,13pt,14,15,16, 17,18 & 21	Ivrem Curdo	16 Sr. III 19.7.76	-
4.	Sirangull	4,5,6,7,8,10,11,12,13, 14,15,16,17 & 18	Sirangull	Ext. 53 Sr III 31.3.77	-
5.	Ivrem Buzuruco	5pt,12,13,14,15, 16,17,18,19pt,20,21,22, 23,25pt, 28 pt,29,30	Ivrem Buzuruco	16 Sr. III 19.7.76	-
6.	Sirsordem	1pt,2,3pt,4pt,10, 11pt,12,13,14pt,15,16 & 17	Sirsordem	52 Sr. III 30.03.76	-
7.	Golauli	3 pt,4, 7 pt,9 pt	Golauli	38 Sr. III 20.12.85	-
8.	Codval	1 to 5	Codval	-	50 Sr. III 15.03.94
9.	Carambolim Brama	21,22,23,24,25pt,26 pt, 27, 28,29,30, 31,32,33,34,35,36,37,38, 39,40,41,42,43, 44,45,46,47,48,49,50,51, 58pt,59,60,62pt,64,65	Carambolim Brama	14 Sr. III 05.07.79	-
10.	Surla	9,20,21,22,23,25,28,29, 30	Surla		Sup. 50 11.03.94
11.	Nanorem	3,4,6pt,7pt,9,10pt,11,12,13,14, 16 pt,17,18, 19pt,20,21	Nanorem	40 Sr. III 10.01.78	-

ANNEXURES

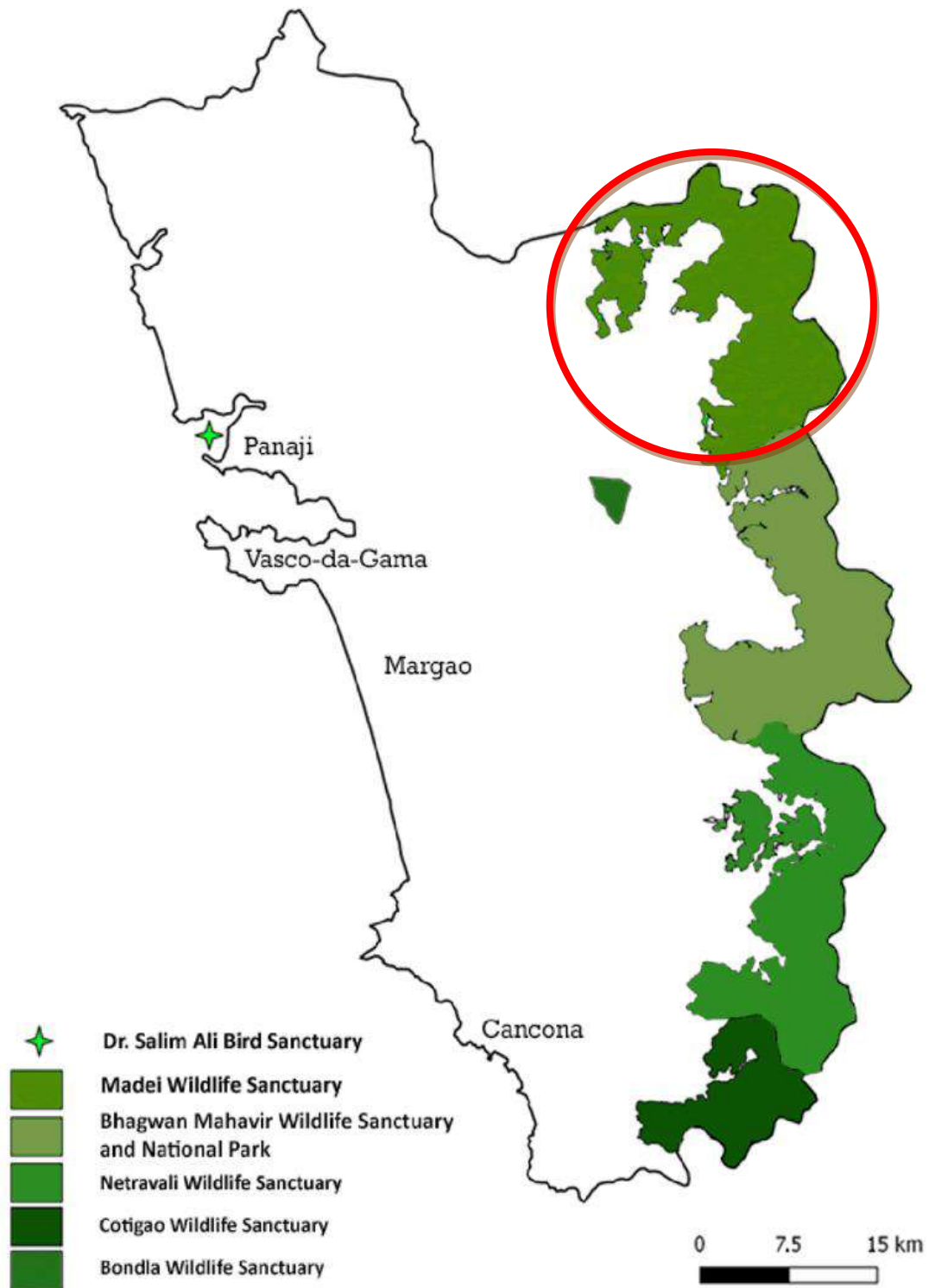
12.	Sigonem	23,24 1 to 17	Sigonem	40 Sr. III 10.01.78	-
13.	Quelaudem	2,3,4,5,6,7,8,9,10,11,12, 13,14,15 16,17,18,19,20pt,21,22, 31pt,37	Quelaudem	44 Sr. III 01.02.79	-
14.	Caranzol	1 to 63	Caranzol	1 Sr. III 05.04.79	-
15.	Xelpo Buzuruco	1 to 30	Xelpo Buzuruco	1 Sr. III 08.03.79	-
16.	Pale	22,23,24,25pt,29pt,34,3 5,36pt	Pale	1 Sr. III 05.04.79	-
17.	Zornem	18pt,19,20,21,23,25,26, 49,50,51	Zornem	20 Sr. III 14.08.80	-
18.	Dabem-I	10	Dabem-I	20 Sr. III 14.08.80	-
19.	Dabem-II	23 to 29,31,32,33	Dabem-II	20 Sr. III 14.08.80	-
20.	Satrem	1 to 6	Satrem	9 Sr. III 28.05.81	-
21.	Derodem	1 to 16	Derodem	8 Sr. III 21.05.81	-
22.	Vainguinim	1,2,3,4pt,5,6,7	Vainguinim	-	34 Sr. III 19.11-92
23.	Zaranim	1 & 2pt	Zaranim	-	28 Sr. III 09.10.92
24.	Choraundem	8,9,10,11,12,13,14,15,1 7,19	Choraundem	2 Sr. III 09.04.94	-
25.	Govanem	2,3,4,5,6pt,24,25,26,27	Govanem	Supp. 50 Sr. III 11.03.94	-
26.	Pendral	1 to 9	Pendral	Supp. 50 Sr. III 11.03.94	-
27.	Compordem	7	Compordem	40 Sr. III 31.12.98	-
28.	Maloli	11pt, 16pt	Maloli	40 Sr. III 31.12.98	-
29.	Codal	11,12,13,14,25,26,27,28	Codal	40 Sr. III 31.12.98	-
30.	Assodem	5,6pt,10/2,6,8,9,10,11, 12/1,4,5,13,14/2,15,16 ,17,18,19,20pt	Assodem	-	43 Sup. Sr. III 20.01.94

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31.	Naneli	13	Naneli	-	-
32.	Ponsuli	4,5,30 to 39	Ponsuli	-	-

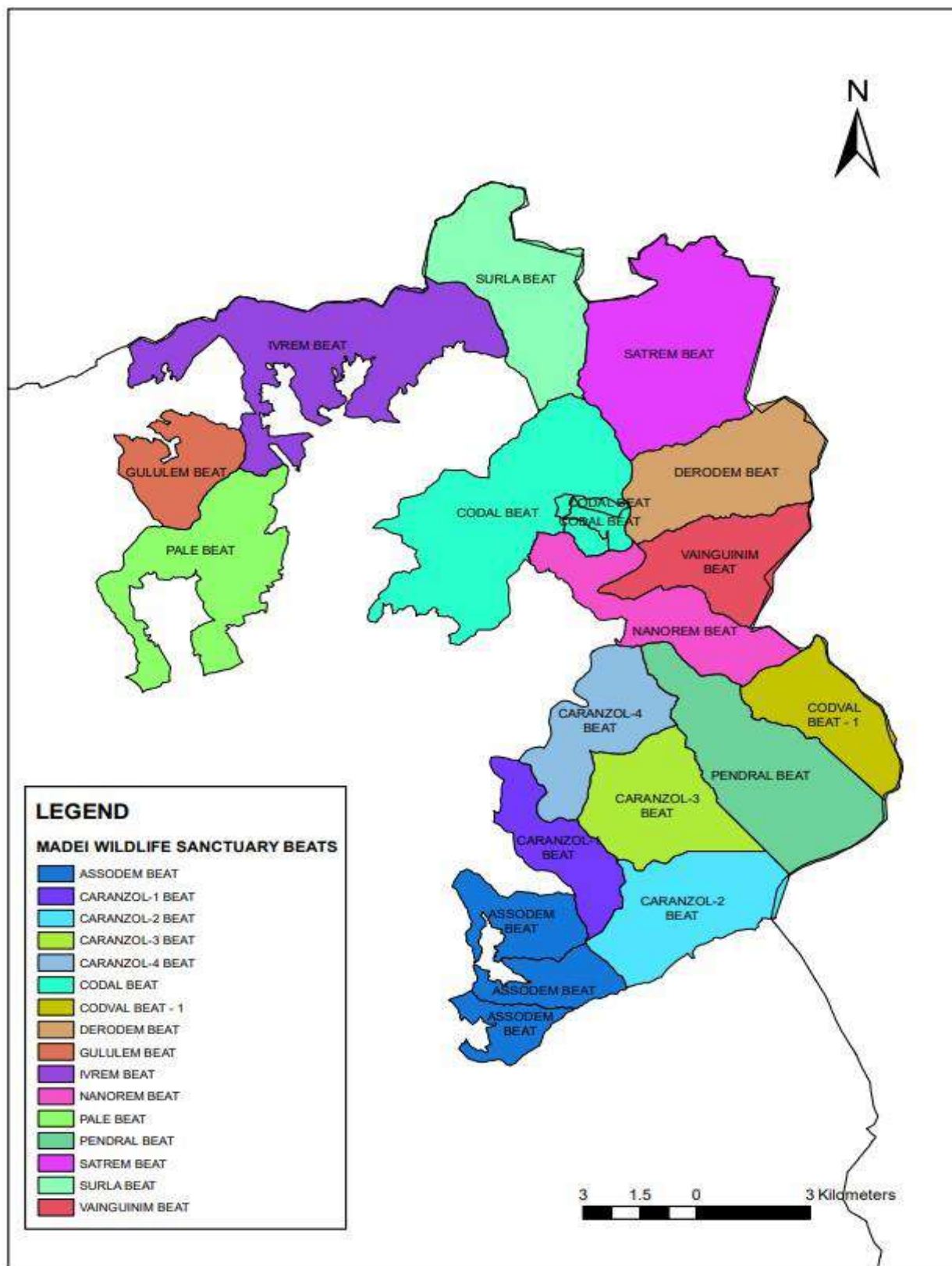
ANNEXURE-III

Map of Madei Wildlife Sanctuary



ANNEXURE-IV A

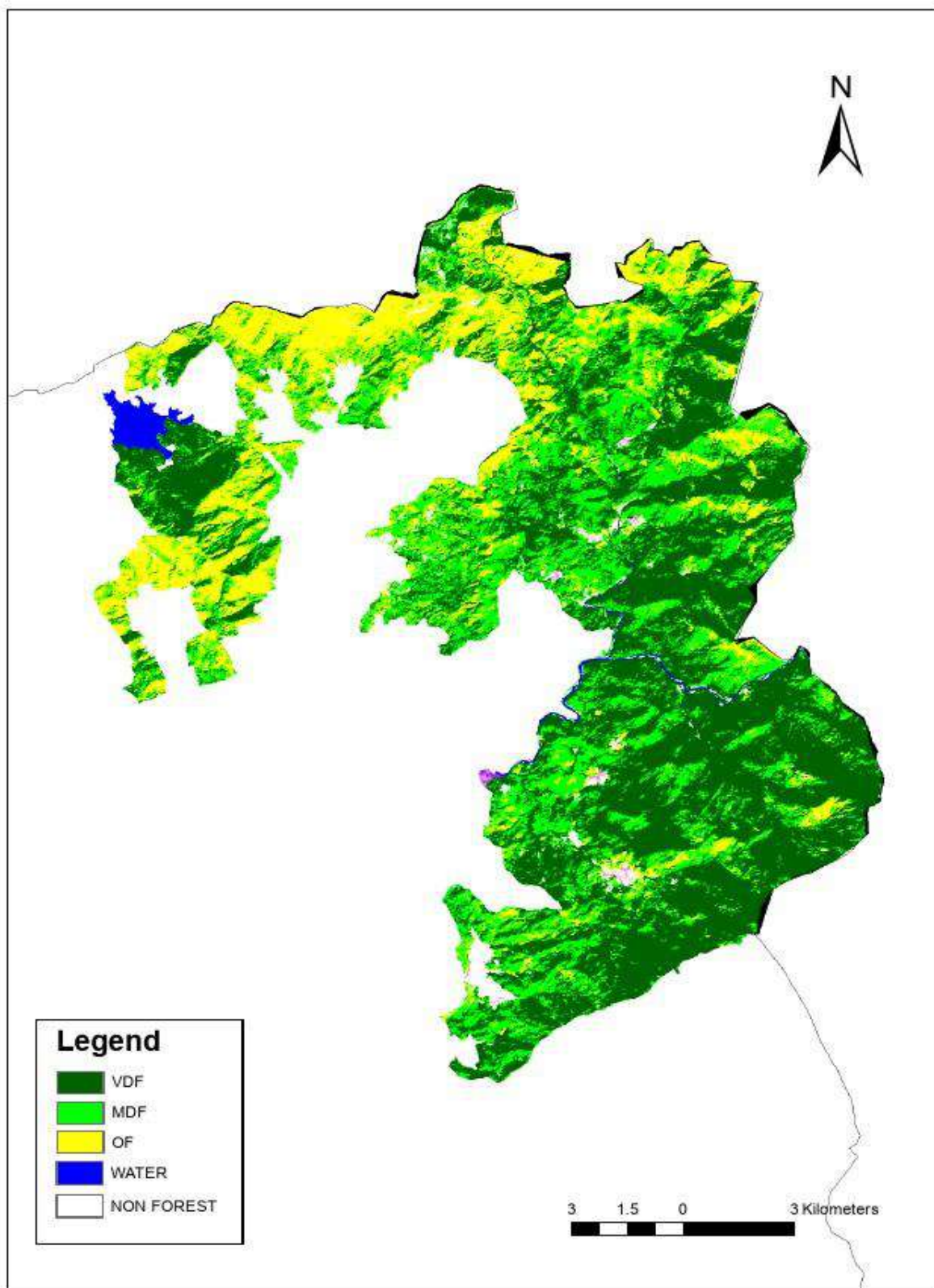
Map of Round and Beat maps of Madei Wildlife Sanctuary.



ANNEXURE-IV B**Details of Rounds and Beats in Madei Wildlife Sanctuary**

Sr. No.	Round	Beat
1	Chauraunem	Pale
		Ivrem
		Gululem
		Surla
2	Caranzol	Pendral
		Cranzoll
		CaranzollII
		CaranzollIII
		Caranzol-IV (Bondir)
		Assodem
3	Codal	Satrem
		Vainguinim
		Derodem
		Codal
		Nanorem
		Codval

ANNEXURE-V
Vegetation Map of Madei Wildlife Sanctuary



ANNEXURE-VI**Details of water holes in Madei Wildlife Sanctuary**

Sr.No.	Round	Beat	No of Waterholes
1	Charaunem	Ivrem	05
		Surla	01
		Pale	03
2	Codal	Satrem	11
		Vainguinim	01
		Codval	02
		Codal	07
		Derodem	02
3	Caranzol	CaranzolI	04
		CaranzolII	04
		CaranzolIII	02
		CaranzolIV	04
		Assodem	06
		Pendral	02
		Total	54

ANNEXURE-VII

**No.of tourists and revenue generated in Madei Wildlife Sanctuary in Last
ten years**

Sr.No.	Year	No.of Tourists	Amount (Rs)
1	2011-2012	193	3,530
2	2012-2013	240	5,140
3	2013-2014	1769	59,495
4	2014-2015	4191	96,085
5	2015-2016	16999	4,99,385
6	2016-2017	13037	3,64,495
7	2017-2018	14824	3,38,220
8	2018-2019	184141	5,58,665
9	2019-2020	10007	2,60,760
10	2020-2021	24945	15,27,470
11	2021-2022 (Covid)	52	5,200
12	2022-2023	3296	2,80,430

ANNEXURE-VIII**Flora of Madei Wildlife Sanctuary**

Sr. No	Vernacular Name	Scientific Names
1.	Hedu	<i>Adina cordifolia</i>
2.	Cadamb	<i>Anthocephalus cadamba</i>
3.	Khair	<i>Acacia catechu</i>
4.	Otamb	<i>Artocarpus lakoocha</i>
5.	Patphanas	<i>Artocarpus hirsutus</i>
6.	Phanas	<i>Artocarpus integrifolia</i>
7.	Saton	<i>Alstonia scholaris</i>
8.	Bel	<i>Aegle marmelos</i>
9.	Siras	<i>Albizzia lebeck</i>
10.	Kinay	<i>Albizzia procera</i>
11.	Kalosiras	<i>Albizzia odoratissima</i>
12.	Ramphal	<i>Annona reticulate</i>
13.	Phadgus/Mirio	<i>Alseodaphne semicarpifolia</i>
14.	Sali	<i>Aporosa cardiosperma (lindleyana)</i>
15.	Jasmudi/Upas	<i>Antiaris toxicaria</i>
16.	Kaju	<i>Anacardium occidentale</i>
17.	Katekaunch	<i>Bridelia retusa</i>
18.	Sawar	<i>Bombax ceiba</i>

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19.	Sawar(silk cotton)	<i>Bombax insigne</i>
20.	Char	<i>Buchanania lanzan</i>
21.	Palas	<i>Butea monosperma</i>
22.	Apto	<i>Bauhinia racemose</i>
23.	Imgli/Menkumbyo	<i>Barringtonia acutangula</i>
24.	Tikhi	<i>Cinnamomum zeylanicum</i>
25.	Makadbhiran	<i>Caralia bracteata</i>
26.	Kumbyo	<i>Careya arborea</i>
27.	Bayo/Balo	<i>Cassia fistula</i>
28.	Vhadli -Bhakran	<i>Cordia myxa</i>
29.	Undi	<i>Calophyllum apetalum</i>
30.	Karmal	<i>Dillenia pentagyna</i>
31.	Shisham	<i>Dalbergia latifolia</i>
32.	Kalajad	<i>Diospyros oocarpa</i>
33.	Goinda	<i>Diospyros montana</i>
34.	Pongaro	<i>Erythrina suberosa</i>
35.	Vad	<i>Ficus bengalensis</i>
36.	Rumbad	<i>Ficus glomerata</i>
37.	Vhadlokharvat	<i>Ficus hispida</i>
38.	Datir, Umbar	<i>Ficus nervosa</i>
39.	Pipal	<i>Ficus religiosa</i>

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40.	Triphal	<i>Fragara badruna</i>
41.	Jagam	<i>Flacourtia jangomas</i>
42.	Chafra	<i>Ficus Montana</i>
43.	Bhiran	<i>Garcinia indica</i>
44.	Dharambo	<i>Garcinia gummigata</i>
45.	Khushimb	<i>Garuga pinnata</i>
46.	Dhaman	<i>Grewia tiliifolia</i>
47.	Shivan	<i>Gmelina arborea</i>
48.	Vamvlo/Oval	<i>Holoptelia integrifolia</i>
49.	Ranbibo	<i>Holigarna arnotiana</i>
50.	Kasti	<i>Hydnocarpus laurifolia</i>
51.	Pav/Kavsi	<i>Hopea ponga (whitiana)</i>
52.	Varang	<i>Kydia calycina</i>
53.	Moi	<i>Lanea grandis</i>
54.	Nano	<i>Lagerstroemia parviflora</i>
55.	Nano	<i>Lagerstroemia lanceolata (microcarpa)</i>
56.	Ambo	<i>Mangifera indica</i>
57.	NagChampho	<i>Mesua ferrea</i>
58.	Kalamb	<i>Mitragyna parvifolia</i>
59.	Shendri	<i>Mallotus philippinensis</i>
60.	Onval	<i>Mimusops elengi</i>

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61.	Jayphal	<i>Myristica fragrans</i>
62.	Kayphal	<i>Myristica malbarica</i>
63.	Kirni	<i>Manilkara hexandra</i>
64.	Surangi	<i>Mammea longifolia</i>
65.	Chandodo	<i>Macranga peltata</i>
66.	Hoom	<i>Miliusa veluntina</i>
67.	Podaval/Davamdak	<i>Oroxylum indicum</i>
68.	Assan	<i>Pterocarpus marsupium</i>
69.	Karanj	<i>Pongamia pinnata</i>
70.	Miryo	<i>Polyalthea fragrans</i>
71.	Gulumb	<i>Persea macrantha</i> (<i>Machilus macrantha</i>)
72.	Anvalo	<i>Phyllanthus embilica</i>
73.	Gel	<i>Randia dumetorum</i>
74.	Kharsang	<i>Radermachera xylocarpa</i>
75.	Kusko	<i>Sterospermum suaveolens</i>
76.	Padal	<i>Sterospermum colais (chelonoides)</i>
77.	Kazro	<i>Strychnos nuxvomica</i>
78.	Kazro (Smallfruits)	<i>Strychnos potatorium</i>
79.	Kasamb	<i>Schleichera oleosa</i>
80.	Uro	<i>Sapium insigne</i>

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81.	Jambol	<i>Syzygium cumuni</i>
82.	Bhedas	<i>Syzygium zeylanicum</i>
83.	Ambado	<i>Spondias mangifera</i>
84.	Kulinder	<i>Sterculia guttata</i>
85.	Dhavoruk/Pandruk	<i>Sterculia urens</i>
86.	Biboi	<i>Semicarpus anacardium</i>
87.	Asok	<i>Saraca indica</i>
88.	Tun, Mahanim	<i>Toona hexandra (Cedreala toona)</i>
89.	Chinch	<i>Tamarindus indica</i>
90.	Arjun	<i>Terminalia arjuna</i>
91.	Kindal	<i>Terminalia paniculata</i>
92.	Marat	<i>Terminalia crenulata</i>
93.	Ghoting	<i>Terminalia bellerica</i>
94.	Harda	<i>Terminalia chebula</i>
95.	Zarmal	<i>Tetrameles nudiflora</i>
96.	Sailo	<i>Tectona grandis</i>
97.	Bomvaropetari	<i>Trewia nudiflora</i>
98.	Kapshi (Ghol)	<i>Trema orientalis</i>
99.	Bhendi	<i>Thesoesia populnea</i>
100.	Dhavimatti (Bailado)	<i>Vitex altissima</i>
101.	Zambo	<i>Xylia xylocarpa</i>

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ProminentHerbs/shrubs/Climbers

Sr.No.	Vernacular Names	ScientificNames
1)	Nilbedsi	<i>Ardesia solanacea (Shrub)</i>
2)	Aghado	<i>Achyranthus aspera (Herb)</i>
3)	Adulso	<i>Adhatoda zeylanica (shrub)</i>
4)	Ranbhendi	<i>Abelmoschus moschatus (herb)</i>
5)	Shatavari	<i>Asparagus racemosus (Climber)</i>
6)	Pashanbhedi	<i>Aerva lantana (Herb)</i>
7)	Gunj	<i>Abrus precatorius (Climber)</i>
8)	Phaterphod	<i>Bridelia scandens (shrub)</i>
9)	Chimbil	<i>Bauhinia vahli (climber)</i>
10)	Punarnava	<i>Boerhavia diffusa (herb)</i>
11)	Vaghati	<i>Capparis monii (Climber)</i>
12)	Rui	<i>Calotropis gigantean (shrub)</i>
13)	Mandukparni	<i>Centella asiatica (Creeper)</i>
14)	Tykhilo	<i>Cassia tora (Herb)</i>
15)	Vakeri	<i>Caesalpinia crista (Climber)</i>
16)	Uski	<i>Calicopteris floribunda (Climber)</i>
17)	Karvi	<i>Carvia callosa (Shrub)</i>

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18)	Kangli	<i>Celastrus paniculata</i> (Climber)
19)	Padaval	<i>Cyclea burmanii</i> (Twining herb)
20)	Dasari	<i>Colebrookia oppositifolia</i> (shrub)
21)	Ardri/Ayamsar	<i>Calicarpa tomentosa</i> (Shrub)
22)	Bhandir	<i>Clerodendron infortunatum</i> (shrub)
23)	Karvand	<i>Carissa congesta</i> (Shrub)
24)	Gajro	<i>Caesalpinia bonducella</i> (Climber)
25)	Gardul	<i>Entada pusaetha</i> (Climber)
26)	Nagalkudo	<i>Ervatarrhia alternifolia</i> (<i>Tabernamontana hyeneana</i>) Shrub
27)	Maco	<i>Eclipta alba</i> (herb)
28)	Bondar	<i>Flemingia strobilifera</i> (Shrub)
29)	Menki	<i>Glycosmis mauritiana</i> (<i>pentaphylla</i>) Shrub
30)	Waghcampho	<i>Gloriosa superba</i> (Climber)
31)	Kudo	<i>Holorrhena pubescens</i> (Shrub)
32)	Dudhshiri	<i>Hemidesmus indicus</i> (Climber)
33)	Kivan	<i>Helecteres isora</i> (Shrub)
34)	Pitkoli	<i>Ixora coccinia</i> (Shrub)
35)	Kante Bhonvri	<i>Ichonocarpus frutescence</i> (Climber)
36)	Erandi	<i>Jatropha curcus</i> (Shrub)
37)	Jino	<i>Lea macrophylla</i> (shrub)

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38)	Dino	<i>Lea indica (Shrub)</i>
39)	Tumbo	<i>Leucas aspera (herb)</i>
40)	Ansali	<i>Microcos paniculata (Shrub)</i>
41)	Khaskuli	<i>Mucuna pruriens (Climber)</i>
42)	Wagati/Vakeri	<i>Mollava spicata (Climber)</i>
43)	Nakeri	<i>Melastoma malabathricum (Shrub)</i>
44)	Rankarvel	<i>Murraya exotica (Shrub)</i>
45)	Patri	<i>Mussaenda glabrata (frondosa)</i> <i>Shrub</i>
46)	Tin pani, Pitmari	<i>Naregamia alata (Herb)</i>
47)	Tulas	<i>Ocimum sanctum (Herb)</i>
48)	Ramtulas	<i>Occimum omericanum (Herb)</i>
49)	Miri	<i>Piper nigrum (Climber)</i>
50)	Bhuiyanvali	<i>Phyllanthus amarus (Herb)</i>
51)	Bidarikanda	<i>Pueraria tuberosa (Climber)</i>
52)	Atki/Sarpgandha	<i>Rauwolfia serpentina (Herb)</i>
53)	Errand	<i>Ricinus communis (Shrub)</i>
54)	Ghotvel	<i>Smilax zeylanica (Climber)</i>
55)	Nirgund	<i>Vitex nigundo (Shrub)</i>
56)	Kanera	<i>Ziziphus oenoplea (shrub)</i>
57)	Churna	<i>Zizipus rugosa (Climber)</i>

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58)	Pitvel/Damvel	<i>Tylophora indica (asthamatica)</i>
59)	Amrutvel/gulvel	<i>Tinospora cordifolia (Climber)</i>

Prominent Gymnosperm, Bamboo, Rattans and other species

Sr. No.	Vernacular Names	Scientific Names
1)	Kumbal-Gymnosperm	<i>Gnetumula (Climber)</i>
2)	Kanki-Bamboo	<i>Dendrocalamus strictus</i>
3)	Velu	<i>Bambusa bambos</i>
4)	Horda	<i>Ochlandra talbotti</i>
5)	Chivar	<i>Oxytenanthera ritcheyii</i>
6)	Beth –Cane	<i>Calamus thwaitesii</i>
7)	Small beth-Cane	<i>Calamus pseudo-tenuis</i>
8)	Billamad- Palm	<i>Caryota urens</i>
9)	Kevda/Bonki	<i>Pandanus tectorius</i>

ANNEXURE-IX**Check list of Mammals of Madei Wildlife Sanctuary.**

Sr No.	Common Name	Scientific name
1.	Tiger (Wagh)	<i>Panthera tigris</i>
2.	Panther/Black Panther (Bibto Wagh)	<i>Panthera pardus</i>
3.	Wild Dog/Dhole (Devcolo)	<i>Cuon alpinus</i>
4.	The Jungle Cat (Bhul Manzor)	<i>Felis chaus</i>
5.	The Sloth Bear (Vashel/Ashwal)	<i>Melurus ursinus</i>
6.	The Common Otter (Udh)	<i>Lutra lutra</i>
7.	Sambhar (Meru)	<i>Cervus unicolor</i>
8.	Spotted Deer (Chital)	<i>Axis axis</i>
9.	Barking Deer (Bhekaro/Kuring)	<i>Muntiacus muntjak</i>
10.	Gaur or Indian Bison (Gavo)	<i>Bos gaurus</i>
11.	Mouse Deer (Pisoi)	<i>Tragulus memminna</i>
12.	Pangolin (Thiryo)	<i>Manis crassicaudata</i>
13.	Slender Loris (Van Manus)	<i>Loris tardigradus</i>
14.	Small Indian Civet Javde)	<i>Viverricula indica</i> <i>Desmarest</i>
15.	Leopard Cat (Wagatti)	<i>Felis bengalensis</i>
16.	Malabar Giant Squirrel (Shenkro)	<i>Ratufa indica</i>
17.	Common Flying Squirrel (UdPakho)	<i>Petaurista petaurista</i>
18.	Flying Fox (pakho)	<i>Pteropus giganteus</i>
19.	Horse Shoe Bat (Vaghul)	<i>Rhinolophus luctus</i>

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20.	Dormer's Bat (vaghul)	<i>Pipistrellus dormer</i>
21.	Wroughton's Free Tailed Bat (Vaghu)	<i>Otomops wroughtoni</i>
22.	Bandicoot rat (Kolinder)	<i>Bandicoota indica</i>
23.	Three Striped Palm Squirrel (Chani/Khar)	<i>Fanambulus palmarum</i>
24.	Indian Field Mouse (Undir)	<i>Mus budooga</i>
25.	House Rat (Undir)	<i>Rattus rattus</i>
26.	House Shrew (Chuchunderi)	<i>Suncus murinus</i>
27.	Palm Civet (Katannoor)	<i>Paradoxurus hermaphroditus</i>
28.	Jackal (Kolo)	<i>Canis aureus</i>
29.	Porcupine (Sal)	<i>Histrix indica</i>
30.	Common Mongoose (Munguse)	<i>Herpestes edwardsii</i>
31.	Wild Boar (Ran Dugar)	<i>Sus scrofa</i>
32.	Indian Hare (Samso)	<i>Lepus nigricollis</i>
33.	Common Langur (Makad)	<i>Presbytes entellus</i>
34.	Bonnet Macacque (Makad)	<i>Macaca radiate</i>

ANNEXURE – X**Checklist of Avifauna of madei Wildlife Sanctuary.**

Sr. No.	Name of Birds (Local Name)	Scientific Name
1.	Cattle Egret (Gay Bake)	<i>Bubulcus ibis</i>
2.	Pond Heron (Bakhe)	<i>Ardeola grayii</i>
3.	Black Winged Kite (Kali Ghar)	<i>Elanus caeruleus</i>
4.	Pariah Kite	<i>Milvus migrans</i>
5.	Brahminy Kite (Ghon)	<i>Haliastur indus</i>
6.	Shikra (Ghidge)	<i>Accipiter badius</i>
7.	White-Eyed Buzzard Eagle	<i>Butastur teesa</i>
8.	Peninsular Serpent Eagle (Morayalo)	<i>Spilornis cheela</i>
9.	Black Eagle (Kalo garud)	<i>Ictinaetus malaiensis</i>
10.	Shahin Falcon	<i>Falco peregrinus peregrinator</i>
11.	Kestrel (salvo)	<i>Falco tinnunculus</i>
12.	Grey Quail	<i>Coturnis pectoralis</i>
13.	Common Bustard	<i>Ardeotis nigriceps</i>
14.	Quail	<i>Genus coturnix</i>
15.	Grey Jungle Fowl (Rankombdi, Rankomo)	<i>Gallus sonneratti</i>
16.	White-breasted Waterhen (Kuakobi)	<i>Amaurornis phoenicurus</i>
17.	Coot (varkari)	<i>Fulica atra</i>
18.	Red-wattled Lapwing	<i>Vanellus indicus</i>
19.	Grey fronted Green Pigeon (haddi, oddi, Yenkovdo)	<i>Treron affinis</i>
20.	Imperial Pigeon (Khawan, hadduk)	<i>Ducula aenea</i>

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21.	Blue Rock Pigeon (Parvo)	<i>Columba livia</i>
22.	Nilgiri Wood Pigeon (Tam)	<i>Columba elphinstonii</i>
23.	Rufous Turtle Dove	<i>Streptopelia orientalis</i>
24.	Little Brown Dove	<i>Spilopelia senegalensis</i>
25.	Spotted Dove (Kavdo, Thiphyache parve)	<i>Spilopelia chinensis</i>
26.	Emerald Dove (Tel Kavado, mana kavdo)	<i>Chalcophaps indica</i>
27.	Blossom headed Parakeet	<i>Psittacula roseate</i>
28.	Blue-winged Parakeet (rankir)	<i>Psittacula columboides</i>
1.	Lorikeet	<i>Trichoglossus moluccanus</i>
29.	Indian Cuckoo (Pavso)	<i>Cuculus micropterus</i>
30.	Koel (Kogul)	<i>Eudynamys scolopaceus</i>
31.	Crow- Pheasant	<i>Centropus sinensis</i>
32.	Barred Owlet	<i>Strix varia</i>
33.	Indian Night jar	<i>Caprimulgus asiaticus</i>
34.	Palm Swift	<i>Cypsiurus balasiensis</i>
35.	Crested Tree Swift (ban)	<i>Hemiprocne coronate</i>
36.	Small Blue Kingfisher	<i>Alcedo atthis</i>
37.	White Breasted Kingfisher (Kirkiro)	<i>Halcyon smyrnensis</i>
38.	Pied Kingfisher (Shibro kirkiro)	<i>Ceryle rudis</i>
39.	Chestnut Headed Bee- Eater (Patakili, Kiranti)	<i>Merops leschenaultia</i>
40.	Blue Tailed Bee-Eater	<i>Merops philippinus</i>
41.	Little Green Bee-Eater (Dhakali Patakilli)	<i>Merops orientalis</i>
42.	Roller/Bluejay	<i>Coracias benghalensis</i>
43.	Hoopoe (Huddo)	<i>Eurasian hoopoe</i>

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44.	Malabar Grey Hornbill (Bonas, bakevayre, Vayere)	<i>Ocyrceros griseus</i>
45.	Great Pied Hornbill (Kakon, Guddu Vayere)	<i>Buceros bicornis</i>
46.	Brown headed Barbet (rankutturgo)	<i>Psilopogon zeylanicus</i>
47.	White cheeked Barbet	<i>Psilopogon viridis</i>
48.	Malabar Barbet (ambadgo)	<i>Psilopogon malabaricus</i>
49.	Rufous Woodpecker (mest)	<i>Celeus brachyurus</i>
50.	Golden Backed Woodpecker	<i>Dinopium benghalense</i>
51.	Great Black Woodpecker (Vhadlokhotkhoto)	<i>Dryocopus javensis</i>
52.	Brown crowned Pygmy Woodpecker	<i>Hemicircus canente</i>
53.	Heart Spotted Woodpecker (Shibromestulo)	<i>Hemicircus canente</i>
54.	Malabar crested Lark	<i>Galerida malabarica</i>
55.	Crag Martin (pakol)	<i>Ptyonoprogne rupestris</i>
56.	Indian Pitta	<i>Pitta brachyura</i>
57.	Swallow	<i>Hirundo rustica</i>
58.	Striated Swallow	<i>Cecropis striolata</i>
59.	Bay-Backed Shrike	<i>Lanius vittatus</i>
60.	Indian Grey Shrike	<i>Lanius excubitor</i>
61.	Brown Shrike (Firangi Kasay)	<i>Lanius cristatus</i>
62.	Golden Oriole (son-haldo)	<i>Oriolus oriolus</i>
63.	Black Headed Oriole (Tamuso, haldulo)	<i>Oriolus xanthornus</i>
64.	Hair Crested Drongo (skekryakatko)	<i>Dicrurus hottentottus</i>
65.	Black Drongo (Kalpiti, Khapri Kirkavlo)	<i>Dicrurus macrocerus</i>
66.	Grey Drongo (gobrokirkavlo)	<i>Dicrurus leucophaeus</i>
67.	White Bellied Drongo	<i>Dicrurus caerulescens</i>

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68.	Bronzed Drongo (kasha katko)	<i>Dicrurus aeneus</i>
69.	Large Rackettailed Drongo (Vhadlokirkavlo, kaler)	<i>Dicrurus paradiseus</i>
70.	Greyheaded Myna	<i>Sturnia malabarica</i>
71.	Indian Myna (vaklasalori)	<i>Acridotheres tristis</i>
72.	Jungle Myna (Ran Salori)	<i>Acridotheres fuscus</i>
73.	Tree Pie	<i>Dendrocitta vagabunda</i>
74.	House Crow (kavlo)	<i>Corvus splendens</i>
75.	Jungle Crow (Dom Kavlo)	<i>Corvus macrorhynchos</i>
76.	Piedfly catcher Shrike	<i>Hemipus picatus</i>
77.	Wood Shrike	<i>Tephrodornis pondicerianus</i>
78.	Malabar Wood Shrike	<i>Tephrodornis sylvicola</i>
79.	Large Cuckoo Shrike	<i>Coracina macei</i>
80.	Black-headed Cuckoo Shrike (khaprisojkar)	<i>Coracina melanoptera</i>
81.	Orange Minivet (Vhadleshendre)	<i>Pericrocotus flammeus</i>
82.	Rosy Minivet	<i>Pericrocotus roseus</i>
83.	Small Minivet (dhakleshendre)	<i>Pericrocotus cinnamomeus</i>
84.	Iora (sonyale)	<i>Aegithina tiphia</i>
85.	Gold-fronted Chloropsis	<i>Chloropsis aurifrons</i>
86.	Jerdon's Chloropsis	<i>Chloropsis jerdoni</i>
87.	FairyBlueBird	<i>Irena puella</i>
88.	Greyheaded Bulbul (shelya pitkoli)	<i>Pycnonotus priocephalus</i>
89.	Rubythroated Yellow Bulbul (ranpitkoli)	<i>Rubigula dispar</i>
90.	Red-whiskered Bulbul Pitkoli)	<i>Pycnonotus jocosus</i>

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91.	Red-vented Bulbul (Khapri Pitkoli)	<i>Pycnonotus cafer</i>
92.	White browed Bulbul (Badbadi pitkoli)	<i>Pycnonotus luteolus</i>
93.	Yellow browed Bulbul	<i>Acritillas indica</i>
94.	Black Bulbul	<i>Hypsipetes leucocephalus</i>
95.	Spotted Babbler	<i>Pellorneum ruficeps</i>
96.	Scimitar Babbler	<i>Pomatorhinus horsfieldii</i>
97.	Blackheaded Babbler	<i>Pteruthius rufiventer</i>
98.	Rufous Babbler (bhanjal, Ghegas)	<i>Turdoides subrufa</i>
99.	Jungle Babbler (Bajbaje)	<i>Turdoides striatus</i>
100.	Brown cheeked Fulvetta	<i>Alcippe poioichephala</i>
101.	Brown-breasted Flycatcher (itkule)	<i>Muscicapa Muttui</i>
102.	Red-breasted Flycatcher	<i>Ficedula parva</i>
103.	White browed Blue Flycatcher	<i>Ficedula superciliaris</i>
104.	White-bellied Blue Flycatcher (itkule)	<i>Cyornis pallipes</i>
105.	Blue throated Flycatcher (itkule)	<i>Cyornis ruberculoides</i>
106.	Tickoli's Red-breasted Flycatcher	<i>Ficedula parva</i>
107.	Verditer Flycatcher (itkule)	<i>Eumyis thalassina</i>
108.	Paradise Flycatcher	<i>Terpsiphone paradisi</i>
109.	Blacknaped Monarch Flycatcher (raj itkule)	<i>Hypothymis azurea</i>
110.	Tailor Bird	<i>Orthotomus Sutorius</i>
111.	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>
112.	Tytler's Leaf Warbler (Chirpute, vichiche)	<i>Phylloscopus tytleri</i>

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113.	Olivaceous Leaf Warbler (chirpute)	<i>Phylloscopus tytleri</i>
114.	Large crowned Leaf Warbler (chirpute)	<i>Phylloscopus occipitalis</i>
115.	Magpie Robin (Madval)	<i>Copsychus saularis</i>
116.	Shama	<i>Copsychus malabaricus</i>
117.	Indian Robin (Kantakoy)	<i>Luscinia brunnea</i>
118.	Redastar	<i>Phoenicurus phoenicurus</i>
119.	Blue-headed rock thrush	<i>Monticola cinclorhynchus</i>
120.	Blue Rock thrush	<i>Monticola solitarius</i>
121.	Malabar Whistling Thrush (Shilo)	<i>Myophonus horsfieldii</i>
122.	White throated Ground Thrush	<i>Geokichla citrina</i>
123.	Indian Blackbird	<i>Turdus simillimus</i>
124.	Velvet fronted Nuthatch	<i>Sitta frontalis</i>
125.	Tree Pipit	<i>Anthus nodgsoni</i>
126.	Grey Wagtail (Gobreharyale, gobrepitpate)	<i>Motacilla cinerea</i>
127.	Forest Wagtail (ran haryale, ranpitpate)	<i>Dendronanthus indicus</i>
128.	Large Pied Wagtail	<i>Motacilla maderaspatensis</i>
129.	Thick billed Flowerpecker	<i>Dicaeum agile</i>
130.	Plain coloured Flowerpecker	<i>Dicaeum concolour</i>
131.	Purple rumped Sunbird (pichpichechirke)	<i>Leptocoma zeylonica</i>
132.	Maroon breasted Sunbird	<i>Cinnyris lotenius</i>
133.	Purple Sunbird (jamblechirke)	<i>Cinnyris asiaticus</i>
134.	House Sparrow (Chimani)	<i>Passer domesticus</i>

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135.	Yellow throated Sparrow	<i>Petronia Xanthocollie</i>
136.	Baya Weaverbird (Sheruk)	<i>Ploceus Philippius</i>
137.	White backed Munia	<i>Lonchura striata</i>
138.	Black headed Bunting	<i>Emberiza melanocephala</i>
139.	Gold fronted Leafbird (haryate, pachvo, tiruli, pansavane)	<i>Chloropsi aurifrons</i>

ANNEXURE -XI**Checklist of reptiles of Madei Wildlife Sanctuary**

Sr. No.	Common Name	Scientific Name
1.	Greenvine Snake (Harvel, Haryali)	<i>Ahaetulla nasuta</i>
2.	Brown Vine Snake (Haryali)	<i>Ahaetulla pulverulenta</i>
3.	Green Keelback (Yevale)	<i>Macropisthodon plumbicolor</i>
4.	Chekered Keelback (Hevalge)	<i>Xenochrophis piscator</i>
5.	Common Indian Krait (Kaner)	<i>Bungarus caeruleus</i>
6.	Goldenback Tree Snake (Nanado)	<i>Chrysopelea ornate</i>
7.	Painted Bronzeback (Nanado)	<i>Dendrelaphis pictus</i>
8.	Bronzeback Tree Snake (Nanati, Nanado)	<i>Dendrelaphis pictus</i>
9.	Saw Scaled Viper (Phurso)	<i>Echis carinatus</i>
10.	Red Sand Boa (Malun)	<i>Eryx johnii</i>
11.	Whitaker's Boa (Manul)	<i>Eryx whitakeri</i>
12.	Beaked Worm Snake (Sulo)	<i>Grypotyphlops acutus</i>
13.	Common Wolf Snake (Pasko)	<i>Lycodon aulicus</i>
14.	Indian Cobra (Nag, Sorop)	<i>Naja naja</i>
15.	King Cobra (Nagin, Dom)	<i>Ophiophagus hannah</i>
16.	Striped Coral Snake (Raktmaindol)	<i>Calliophis nigrescens</i>
17.	Humped Nosed Pit Viper (Chapade)	<i>Hypnale hypnale</i>
18.	Bamboo Pit Viper (Chapade)	<i>Craspedocephalus gramineus</i>
19.	Forsten Cat Snake (Sodan)	<i>Boiga forsteni</i>
20.	Indian Rat Snake (Divad, Dhaman)	<i>Ptyas mucosa</i>
21.	Indian Rock Phyton (Har, Ajagar)	<i>Python molurus</i>

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22.	Brahminy Worm Snake(Telyo)	<i>Indotyphlops braminus</i>
23.	Malabar Pit Viper(Chapde)	<i>Trimeresurus malabaricus</i>
24.	Bamboo Pit Viper(Chapde)	<i>Trimeresurus gramineus</i>
25.	Russell's Viper (Ghonas, agiomaindol)	<i>Daboia russelii</i>
26.	Blind Snake (Telyo)	<i>Typhlopidae</i>
27.	Beaked Blind Snake (Telyo)	<i>Grypotyphlops acutus</i>
28.	Shield Tailed Snake (Khapar-kavalya)	<i>Uropeltis</i>
29.	Common Wolf Snake (Pasko)	<i>Lycodon aulicus</i>
30.	Banded Kukri (Patteri kukri)	<i>Oligodon arnensis</i>
31.	Russell's Kukri Snake (Kukri)	<i>Oligobom taeniolatus</i>
32.	Common Cat Snake(Sodan)	<i>Boiga trigonata</i>
33.	Ceylon Cat Snake(Pasko)	<i>Boiga ceylonensis</i>
34.	Beddom's Keelback (Beddomnaneti)	<i>Asphiesma beddomei</i>
35.	Montane Trinket Snake (Tajgar)	<i>Coelognathus Helena monticollaris</i>
36.	Ornate Flying Snake (Katmala)	<i>Chrysopelea ornate</i>
37.	Bronze Back Tree Snake (Nanado)	<i>Dendrelaphis tristis</i>
38.	Banded Racer (Dul nagin)	<i>Argyrogena fasciolata</i>
39.	Buff Striped Keelback (Yevale)	<i>Amphiesma stolatum</i>
	Lizards	
1.	Rouxii Lizard (Sheddo),	<i>Calotes rouxii</i>
2.	Indian Garden Lizard (Sheddo)	<i>Calotes versicolor</i>
3.	Indian Chameleon	<i>Chamaeleon zeylanicus</i>
4.	Flying Lizard (Pavto)	<i>Draco</i>

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5.	Bronze Skink (Shirli),	<i>Eutropisma cularia</i>
6.	Forest Calotes	<i>Calotes</i>
	Turtles	
1	Indian Flap Shell Turtle (TupoKasav)	<i>Lissemys punctate</i>
2	Indian Black Turtle (HagaroKasav, Kasav)	<i>Melano chelystrijuga</i>
	Frogs and Toads	
1.	Indian Toad (Manaki)	<i>Duttaphyrnus melanostictus</i>
2.	Indian Bull Frog (Bebo)	<i>Hoplobatrachus tigerinus</i>
3.	Indian Skipper frog (Bebki)	<i>Euphlyctis cyanophlyctis</i>
4.	Indian Burrowing Frog (Bebki)	<i>Sphaerotheca breviceps</i>
5.	Malabar Gliding Frog	<i>Rhacophorus malabaricus</i>
6.	Fungoid Frog (Bebki)	<i>Hylarana malabarica</i>
7.	Beddomes Leaping Frog	<i>Indirana beddomi</i>
8.	Bush Frog	<i>Raorchestes</i>
9.	Rao's Burrowing Frog	<i>Sphaerotheca leucorhynchus</i>
10.	Jerdon's Narrow Mouthed Frog	<i>Microhyla</i>
11.	Malabar Tree Toad	<i>Pedostibes tuberculosus</i>
12.	Paddyfield Frog	<i>Fejervarya limnocharis</i>
13.	Common Tree Frog	<i>Polypedates leucomystax</i>
14.	Skittering Frog	<i>Euphlyctis</i>
15.	Ornate Narrow Mouthed Frog	<i>Microhyla ornate</i>
16.	White Nosed Bush Frog	<i>Pseudophilautus leucorhinus</i>
17.	Madei Caecilian	<i>Gegeneophis mhadeiensis</i>
18.	Goa Caecilian	<i>Gegeneophis goaensis</i>
19.	Paresh's Blind Caecilian	<i>Gegeneophis Pareshii</i>

ANNEXURE XII**Checklist of Butterflies of Madei Wildlife Sanctuary.**

Sr. No.	Common Name	Scientific Name
1.	Glassy Tiger	<i>Parantica aglea</i>
2.	Common Emigrant	<i>Catopsilia Pomona</i>
3.	Plain Tiger	<i>Danaus chrysippus</i>
4.	Common Jezebel	<i>Delias eucharis</i>
5.	Common Grass Yellow	<i>Eurema hecabe</i>
6.	Crimson Rose	<i>Pachliopta</i>
7.	Common Mormon	<i>Papilio polytes</i>
8.	Tailed Jay	<i>Graphium agamemnon</i>
9.	Common Evening Brown	<i>Melanitis leda</i>
10.	Common Baron	<i>Euthali aconthea</i>
11.	Tawny Coster	<i>Acraea violae</i>
12.	Peacock Pansy	<i>Junonia almanac</i>
13.	Lemon Pansy	<i>Junonia lemonias</i>
14.	Red Peirrot	<i>Talicauda nyseus</i>
15.	Common Silverline	<i>Spindasis vulcanus</i>
16.	Blue bottle	<i>Graphium sarpedon</i>
17.	Lime Butterfly	<i>Papilio demoleus</i>
18.	Common Sailor	<i>Neptis hylas</i>
19.	Blue Pansy	<i>Junonia orithya</i>
20.	Malabar Tree Nymph	<i>Idea malabarica</i>

ANNEXURES

21.	Common Indian Crow	<i>Euploea core</i>
22.	Mottled Emigrant	<i>Catopsilia pyranthe</i>
23.	Common wanderer	<i>Pareronia valeria</i>
24.	Pioneer	<i>Anaphaeis aurota</i>
25.	Dark Blue Tiger	<i>Tirumala limniace</i>
26.	Stripped Tiger	<i>Danaus genutia</i>
27.	Common Hedge Blue	<i>Actolepis puspa</i>
28.	Danaid Eggfly	<i>Hypolimnas misippus</i>
29.	Great Eggfly	<i>Hypolimnas bolina</i>
30.	Restricted Demon	<i>Notocrypta curvifascia</i>
31.	Southern Birdwing	<i>Troides minos</i>
32.	Common Bluebottle	<i>Graphium sarpedon</i>
33.	Common Mime	<i>Papilio clytia</i>
34.	Paris Peacock	<i>Papilio Paris</i>
35.	Malabar Banded Peacock	<i>Papilio buddha</i>
36.	Tamil Lacewing (Endemic to Western Ghats)	<i>Cethosia nietneri</i>
37.	Clipper	<i>Parthenos sylvia</i>
38.	Grey Count	<i>Tanaecia lepibea</i>
39.	Common Rose	<i>Pachliopta aristolochiae</i>
40.	Malabar Raven	<i>Papilio drabidarum</i>
41.	Blue Oakleaf	<i>Kallima horsfieldi</i>
42.	Blue Mormon	<i>Papilio polymnestor</i>

ANNEXURES**Annexure –XIII****Checklist of Enrichment Plantation type done in Madei Wildlife Sanctuary.**

Sr . No	Year	Round	Beat	Plantation Type	Plantation Area	Scheme	Remarks & GPS Location
1	2011-12	Caranzol	Assodem	Raising plantation of fruit bearing species	5 hac	State Plan	N-15° 27' 30.00" E- 074° 10' 45.00" N-15° 27' 15.00" E- 074° 10' 45.00" N-15° 27' 15.00" E- 074° 11' 15.00" N-15° 27' 30.00" E- 074° 10' 45.00"
2	2011-12	Charaundem	Gulul em	Raising plantation of fruit bearing species	5hac	State Plan	N-15° 36'52.6 " E- 074° 06' 34.5" N-15° 36' 54.7" E- 074° 06' 36.7" N-15° 36' 56.7"

ANNEXURES

							E- 074° 06' 30.6" N-15° 36' 54.7" E- 074° 06' 26.7"
3	2011-12	Codal	Derodem	Raising plantation of fruit bearing species	5 hac	State Plan	N-15° 35'08.3 " E- 074° 13' 12.0" N-15° 35' 12.6" E- 074° 13' 14.0"
4	2012-13	Codal	Nanoda	Plantation of Fruit bearing trees	5hac	State Plan	N-15° 35'04.5 " E- 074° 12' 44.2" N-15° 35' 11.6" E- 074° 12' 36.5"
5	2014-15	Codal	Codal	Creation of Plantation of fruit bearing trees in Maloli of Codal	2.5 hac	CAM PA	N- 15 34' 11.0" E-074 11' 05.6" N- 15 34' 23.3" E-074 11'09.0" N- 15 34' 40.3" E-074 11' 08.2" N- 15 34' 45.9" E-074 11' 06.5" N- 15 34' 49.6"

ANNEXURES

				beat in MWLS			E-074 11' 09.3" N- 15 35' 03.9" E-074 11' 21.5" N- 15 35' 06.4" E-074 11' 22.9" N- 15 35' 14.1" E-074 11' 26.1"
6	2014 -15	Caranzol Round	Caranzol III	Creation of Plantation of fruit bearing trees in Caranzol I of Caranzol I III beat in MWLS	2.5 hac	CAM PA	N- 15 31' 33.5" E-074 12' 22.3" N- 15 31' 42.0" E-074 12' 22.7" N- 15 31' 34.6" E-074 12' 25.4" N- 15 31' 40.8" E-074 12' 25.8"
7	2016 -17	Charaundem	Ivrem	Creation of bamboo and cane plantation	3 hac	State Plan	N-15° 38' 07.6 " E- 074° 10' 00.2" N-15° 38' 06.7" E- 074° 10' 04.9"
8	2016 -17	Caranzol	Assodem	Creation of bamboo	3 hac	State Plan	N-15° 28' 41.4 " E- 074° 11'

ANNEXURES

				and cane plantati on			11.6” N-15° 28’ 48.5” E- 074° 11’ 12.1”
9	2016 -17	Codal	Derod em	Creation of cane plantati on	2 hac	State Plan	N-15° 35’59.0 ” E- 074° 13’ 10.2” N-15° 36’ 01.8” E- 074° 13’ 08.9”
10	2017 -18	Charaun dem	Ivrem	Creation of bamboo plantati on	1hac	State Plan	N-15° 38’17.6 ” E- 074° 10’ 09.1” N-15° 38’ 16.1” E- 074° 10’ 03.8”
11	2017 -18	Codal	Derod em	Creation of cane plantati on	2 hac	State Plan	N-15° 35’55.8 ” E- 074° 13’ 13.1” N-15° 35’ 55.7” E- 074° 13’ 17.7”
12	2018	Caranzol	Assod	Creation of	2	State	N-15° 28’ 41.4 ”

ANNEXURES

	-19		em	bamboo plantati on	hac	Plan	E- 074° 11' 11.6" N-15° 28' 48.5" - 074° 11' 12.1"
13	2019 -20	Charaun dem	Ivrem	Creation of cane plantati on	5 hac	State Plan	N-15° 38'21.6 " E- 074° 09' 21.1" N-15° 38' 22.5" E- 074° 09' 45.4"
14	2019 -20	Charaun dem	Ivrem	Planting of mixed native species and fruit bearing	5 hac	State Plan	N-15° 37'13.6 " E- 074° 09' 23.1" N-15° 37' 14.6" E- 074° 09' 13.9"
15	2019 -20	Charaun dem	Gulul em	Planting of mixed native species and fruit bearing	5 hac	State Plan	N-15° 36'36.9" E- 074° 05' 51.6" N-15° 36'40.2" E- 074° 05' 48.4"
16	2019	Caranzol	Assod	Planting of mixed	5	State	N-15° 27'31.1"

ANNEXURES

	-20		em	native species and fruit bearing	hac	Plan	E- 074° 10' 53.4" N-15° 27'43.2" E- 074° 10' 15.09"
17	2021-22	Codal	Derodem	Planting of mixed native species and fruit bearing	5 hac	State Plan	N- 15 35' 30.9" E-074 13' 01.0" N- 15 35' 22.8" E-074 13'08.0" N- 15 35' 28.6" E-074 13' 08.2" N- 15 35' 25.9" E-074 13' 00.7"
18	2022-23	Charaundem	Surla	Planting of mixed native species and fruit bearing	5 hac	State Plan	N-15° 39'37.12" " E- 074° 10' 29.90" N-15° 39'32.50" E- 074° 10' 33.21"
19	2022-23	Codal	Codal	Plantation of mixed native species and fruit bearing	5 hac	State Plan	N-15° 35'45.07" E- 074° 11' 21.10" N-15° 35'45.50" E- 074° 11' 24.90"

ANNEXURES

20	2022 -23	Charaun dem	Ivrem	Plantati on of bamboo	5 hac	State Plan	N-15° 37'21.0" E- 074° 09' 00.4" N-15° 37'22.8" E- 074° 08' 51.08"
21	2022 -23	Charaun dem	Ivrem	Creation of Cane plantati on	2 hac	State Plan	N-15° 37'29.0 " E- 074° 09' 13.5" N-15° 37'36.9" E- 074° 09' 21.02"
22	2022 -23	Charaun dem	Ivrem	Assisted Nature Regener ation and Gap Planting with indigeno us trees species	5 hac	CAM PA- WL	N- 15 37' 37.7" E-074 09' 21.5" N- 15 37' 44.5" E-074 09'27.2" N- 15 37' 37.8" E-074 09' 3.8" N- 15 37' 35.7" E-074 09' 21.3"
23	2022 -23	Charaun dem	Surla	Assisted Nature Regener ation	5 hac	CAM PA- WL	N- 15 39' 51.37" E-074 10' 18.54" N- 15 39'

ANNEXURES

				and Gap Planting with indigeno us trees species			47.11” E-074 10’16.25” N- 15 39’ 42.85” E-074 10’ 26.45” N- 15 39’ 50.57” -074 10’ 21.90”
24	2023 -24	Charaun dem Part I	Ivrem	Forest fire affected area restorati on	5 hac	State Plan	N-15° 37’ 54.86” E- 074° 07’ 9.71” N-15° 37’ 58.74” E- 074° 07’ 13.61” N-15° 37’ 58.22” E- 074° 07’ 9.17” N-15° 37’ 52.02” E- 074° 07’ 10.61”
25	2023 -24	Codal Part I	Derod em	Forest fire affected area restorati on at site II &	5hac	State Plan	N-15° 36’1.68 ” E- 074° 14’ 5.40” N-15° 36’6.64” E- 074° 14’

ANNEXURES

				III of Derodem			7.99"
26	2023 -24	Codal Part II	Nanoda	Forest fire affected area restoration at Nanoda	4 hac	State Plan	N-15° 33'22.20" E- 074° 13' 58.95" N-15° 33'20.51" E- 074° 13' 58.06"
27	2023 -24	Codal Part I	Derodem	Forest fire affected area restoration at site I	4 hac	State Plan	N-15° 36' 7.14" E- 074° 13' 34.78" N-15° 36' 3.22" E- 074° 13' 40.07" N-15° 35' 54.70" E- 074° 13' 33.62" N-15° 35' 55.91" E- 074° 13' 31.99"
28	2023 -24	Codal Part I	Derodem	Forest fire affected	2.5h ac	State Plan	N-15° 35' 23.12" E- 074° 13' 1.58"

ANNEXURES

				area restorati on at Acacia Plantati on			N-15° 35' 12.58" E- 074° 13' 7.85" N-15° 35' 19.73" E- 074° 13' 4.75" N-15° 35' 22.02" E- 074° 13' 1.57"
29	2023 -24	Codal Part I	Derod em	Restorat ion of degrade d forest due to forest fire at Managa chikon	1hac	State Plan	N-15° 36'34.46 " E- 074° 13' 11.75" N-15° 36'35.89" E- 074° 13' 13.33"
30	2023 -24	Codal Part I	Satre m	Forest fire affected area restorati on Landslid e Area	2.5h ac	State Plan	N-15° 37'53.63" E- 074° 12' 34.33" N-15° 37'51.60" E- 074° 12'13.75"
31	2023 -24	Codal Part I	Satre m	Forest fire affected	4hac	State Plan	N-15° 37'59.75" E- 074° 13'

ANNEXURES

				area restorati on Parwad trail			8.55” N-15° 37’52.85” E- 074° 13’11.28”
32	2023 -24	Codal Part I	Satre m	Forest fire affected area restorati on at Depajira ne gad	7hac	State Plan	N-15° 36’58.66” E- 074° 13’ 32.15” N-15° 36’53.73” E- 074° 13’41.21”
33	2023 -24	Charaun dem Part II	Surla	Forest fire affected area restorati on	2hac	State Plan	N-15° 38’9.92 ” E- 074° 11’ 38.13” N-15° 38’6.96” E- 074° 11’42.69”
34	2023 -24	Codal Part II	Codva 1	Forest fire affected area restorati on	1hac	State Plan	N-15° 33’39.77” E- 074° 15’ 46.80” N-15° 33’37.27” E- 074° 15’48.08”
35	2023	Codal	Derod	Forest	0.5h	State	N-15° 36’ 1.37”

ANNEXURES

	-24	Part I	em	fire affected area restorati on	ac	Plan	E- 074° 14' 19.96" N-15° 36' 1.81" E- 074° 14' 20.88" N-15° 35' 59.25" E- 074° 14' 24.08" N-15° 35' 59.83" E- 074° 14' 21.51"
36	2023 -24	Charaun dem Part II	Surla	Forest fire affected area restorati on	5hac	State Plan	N-15° 39'51.36" E- 074° 10'18.18" N-15° 39'47.16" E- 074° 10'16.29"
37	2023 -24	Caranzol part-II	Caran zol IV	Forest fire affected area restorati on at Caranzo 1 IV beat in Caranzo	5hac	State Plan	N-15° 33' 28.34" E- 074° 12' 28.08" N-15° 33' 30.02" E- 074° 12' 31.20" N-15° 33' 27.40" E- 074°

ANNEXURES

				1 round (part-II) in MWLS			12' 35.89" N-15° 33' 13.60" E- 074° 12' 33.38" N-15° 33' 14.06" E- 074° 12' 27.12" N-15° 33' 21.09" E- 074° 12' 27.56"
38	2023 -24	Caranzol part-II	Caran zol IV	Forest fire affected area restorati on at Caranzo 1 IV beat in Caranzo 1 round (part-II) in MWLS	5hac	State Plan	N-15° 33' 28.34" E- 074° 12' 28.08" N-15° 33' 30.02" E- 074° 12' 31.20" N-15° 33' 27.40" E- 074° 12' 35.89" N-15° 33' 13.60" E- 074° 12' 33.38" N-15° 33' 14.06" E- 074° 12' 27.12" N-15° 33' 21.09" E- 074°

ANNEXURES

							12' 27.56"
39	2023 -24	Charaundem part-II	Gululem	Creation of Canes plantati on at Gulule m beat of Charau ndem round (part-II) of MWLS	3 hac	C.S. S.	N-15° 36' 59.02" E- 074° 06' 25.01" N-15° 36' 53.02" E- 074° 06' 25.04" N-15° 36' 50.02" E- 074° 06' 26.00" N-15° 36' 52.0" E- 074° 06' 32.0"
40	2023 -24	Codal Part I	Codal	Assisted Nature Regener ation and Gap Planting with indigeno us trees species	5 hac	CAM PA	N- 15 33' 49.5" E-074 10' 28.9" N- 15 33' 53.0" E-074 10'33.1" N- 15 33' 00.3" E-074 10'31.3" N- 15 33' 50.02" E-074 10'29.6"
41	2023 -24	Charaundem Part	Gululem	Assisted Nature	5 hac	CAM PA	N- 15 36' 54.0"

ANNEXURES

		II		Regeneration and Gap Planting with indigenous trees species			E-074 06' 29.2" N- 15 36' 53.2" E-074 06'36.4" N- 15 36' 56.3" E-074 06'28.2" N- 15 36' 33.6" E-074 06'32.2"
42	2023-24	Caranzol Part I	Assod em	Assisted Nature Regeneration and Gap Planting with indigenous trees species	5 hac	CAM PA	N- 15 28' 44.22" E-074 11' 06.32" N- 15 28' 31.77" E-074 11'26.08" N- 15 28'42.70" E-074 11'09.53" N- 15 28' 34.17" E-074 11'30.37"

ANNEXURES**Annexure -XIV****Details of Restoration of Grass Plots in Madei Wildlife Sanctuary.**

Sr. No.	Year	Location	Round	Beat	Area	GPS Reading
1	2015-16	Vagheri	Charaundem Round	Pali	2.5hac	N- 15° 36' 34.8" E- 074° 06'00.1" N- 15° 36' 34.5" E- 074° 05'59.7"
2	2016-17	Vainguinium	Codal Round	Vainguinim	3hac	N- 15° 35' 07.6" E- 074° 13'27.1" N- 15° 35' 12.9" E- 074° 13'29.3" N- 15° 35' 10.4" E- 074° 13'23.0" N- 15° 35' 07.0" E- 074°

ANNEXURES

						13'22.6"
3	2018-19	Vagheri	Charaundem Round	Pali	2hac	N- 15° 36' 34.8" E- 074° 06'00.1" N- 15° 36' 34.5" E- 074° 05'59.7"
4	2019-20	Satrem	Codal Round	Satrem	2hac	N- 15° 38' 12.6" E- 074° 14'42.8" N- 15° 38' 14.1" E- 074° 14'43.5"
5	2020-21	Satrem	Codal Round	Satrem	2hac	N- 15° 38' 29.6" E- 074° 10'53.8" N- 15° 38' 22.1" E- 074° 13'58.9"
6	2022-23	Surla	Charaundem Round	Surla	2.5hac	N- 15° 38' 53.28" E- 074°

ANNEXURES

						10'58.37"
						N- 15° 38'
						56.76" E-
						074°
						10'55.47"
						N- 15° 38'
						57.19" E-
						074°
						53'13.94"
						N- 15° 38'
						51.27" E-
						074°
						10'53.97"

ANNEXURES**Annexure - XV****Details of Grass Plot created in Madei Wildlife Sanctuary.**

Sr. No.	Year	Location	Round	Beat	Area	GPS Reading
1	2016 -17	Nanoda	Codal Round	Nanoda	1hac	N- 15° 35' 00.2" E-074° 13'08.9" N- 15° 35' 00.4" E-074° 13'08.0" N- 15° 35' 05.5" E-074° 13'12.3" N- 15° 35' 04.8" E-074° 13'13.2"
2	2016 -17	Ponsuli	Charaund em Round	Gululem	2hac	N- 15° 37' 35.8" E-074° 06'29.8" N- 15° 37' 38.1" E-074° 06'30.1" N- 15° 37' 36.1" E-074° 06'27.8" N- 15° 37' 38.4" E-074° 06'28.2" N- 15° 37' 36.0" E-074° 06'27.0" N- 15° 37' 37.2" E-074° 06'29.4"
3	2017	Pendral	Caranzol	Pendral	2hac	N- 15° 32' 44.6"

ANNEXURES

	-18					E-074° 14'01.2" N- 15° 32' 44.7" E-074° 14'00.3" N- 15° 32' 41.0" E-074° 14'02.2" N- 15° 32' 41.7" E-074° 14'04.0"
4	2019 -20	Derodem	Codal Round	Derodem	1hac	N- 15° 35' 27.0" E-074° 12'56.1" N- 15° 35' 25.7" E-074° 12'58.1"
5	2022 -23	Nanoda	Codal Round	Nanoda	1hac	N- 15° 33' 21.80" E-074° 13'58.23" N- 15° 33' 16.67" E-074° 13'56.72" N- 15° 33' 18.27" E-074° 00'50.07" N- 15° 35' 21.21" E-074° 13'55.62"
6	2022 -23	Codal	Codal Round	Codal	1hac	N- 15° 35' 18.48" E-074° 10'48.59"

ANNEXURES

						N- 15° 35' 19.00" E-074° 10'51.16" N- 15° 35' 20.12" E-074° 10'50.02" N- 15° 35' 17.23" E-074° 10'49.58"
7	2022 -23	Vainguin im	Codal Round	Vainguini m	1hac	N- 15° 35' 05.4" E-074° 13'10.7" N- 15° 35' 00.3" E-074° 13'08.9" N- 15° 35' 01.8" E-074° 13'11.5" N- 15° 35' 00.6" E-074° 13'07.9"
8	2022 -23	Derodem	Codal Round	Derodem	1hac	N- 15° 36' 30.87" E-074° 13'00.90" N- 15° 36' 27.97" E-074° 13'01.98" N- 15° 36' 30.67" E-074° 13'01.71"

ANNEXURES

						N- 15° 36' 28.65" E-074° 13'00.01"
9	2022 -23	Assodem	Caranzol Round	Assodem	1hac	N- 15° 28' 13.53" E-074° 10'27.73" N- 15° 28' 17.60" E-074° 10'23.63" N- 15° 28' 13.21" E-074° 10'26.63" N- 15° 28' 17.97" E-074° 10'25.22"
10	2022 -23	Ivrem	Charaund em Round	Ivrem	3hac	N- 15° 38' 53.1" E-074° 09'11.1" N- 15° 38' 56.2" E-074° 09'15.7" N- 15° 38' 49.4" E-074° 09'13.3" N- 15° 38' 49.2" E-074° 09'16.6"
11	2023 -24	Surla	Charaund em Round	Surla	2hac	N- 15° 38' 01.51" E-074° 11'26.01" N- 15° 38' 06.46" E-074° 11'07.10" N- 15° 31' 04.03" E-074° 11'23.09" N- 15° 37' 98.07" E-074° 11'27.04"
12	2023 -24	Satrem	Codal Round	Satrem	2hac	N- 15° 37' 58.0" E-074° 12'52.5" N- 15° 37' 55.7"

ANNEXURES

						E-074° 12'52.8" N- 15° 37' 52.2" E-074° 12'49.4" N- 15° 37' 54.5" E-074° 12'49.8"
13	2023 -24	Derodem	Codal Round	Derodem	1hac	N- 15° 36' 28.7" E-074° 12'59.8" N- 15° 36' 28.2" E-074° 13'01.6" N- 15° 36' 24.6" E-074° 12'59.2" N- 15° 36' 27.6" E-074° 12'59.4"
14	2023 -24	Landslid e Area Satrem	Codal Round	Satrem	5hac	N- 15° 37' 38.5" E-074° 12'26.4" N- 15° 37' 36.8" E-074° 12'30.0" N- 15° 37' 47.2" E-074° 12'41.8" N- 15° 37'47.7" E-074° 12'38.2"

ANNEXURES

ANNEXURE-XVI

Details of Staff at Madei Wildlife Sanctuary.

Sr. No	Designation	Present man power Strength deployed	Remarks
1	Range Forest Officer	01	Permanent Executive staff
2	Deputy Range Forest Officer	02	
3	Round Forester	03	
4	Forest Guard	24	
5	Regular Labour	13	
6	Trekkers	32	<i>.Daily wage Labourers are employed as per seasonal works ad also for day to day routine mandatory works by the range forest office.</i>
7	Temporary Status Labour	02	
8	Sanitary workers	05	
9	Watch and Ward	10	
10	Lower DivisionClerk	03	
11	MTS	01	
12	Sweeper	01	
13	Watchmen	01	
14	Driver	00	
<i>Apart from permanent staff based on requirement manpower is engaged for seasonal works</i>			

ANNEXURES**ANNEXURE-XVII****List of Existing Buildings for Management in Madei Wildlife Sanctuary**

Sr. No.	Name of Building	Location	Round	G.P.S Reading
1	Range Forest Office	Maloli	Codal	N- 15° 35' 13.9" E- 074° 11' 23.9"
2.	Control Room. Protection camp	Maloli	Codal	N- 15° 35' 13.9" E- 074° 11' 23.9"
3.	Anti- poaching Camp	Assodem	Caranzol	N-15° 28' 49.5" E-074° 10' 59.2"
4.	Anti- poaching Camp	Golauli	Charaundem	N-15° 27' 13.1" E-074° 9' 25.2"
5.	Anti- poaching Camp	Surla	Charaundem	1. N-15° 39' 37.7" E-074° 10' 29.8" 2. N-15° 39' 32.4" E-074° 10' 33.5" 3. N-15° 39' 23.7" E-074° 10' 35.4"
6.	Anti- poaching Camp	Vagheri	Charaundem	N -15° 35' 35.0" E - 074° 06' 05.2"
7.	Anti- poaching Camp	Thane	Charaundem	N -15° 36' 05.7" E - 074° 08' 24.2"
8.	'A' type quarter at Codal used as APC	Codal	Codal	N- 15° 35' 33.7" E- 074° 12' 28.7" N- 15° 35' 34.8" E- 074° 12' 28.9"
9.	'B' type quarter at Nagargao used as Round Office	Nagargao	Codal	N- 15° 33' 10.3" E- 074° 09' 29.0"
10.	'A' type quarter at Valpoi used as Round Office	Valpoi	Caranzol	N- 15° 31' 42.9" E- 074° 07' 47.7"

ANNEXURES

11	NEC, Maloli	Maloli	Codal	N- 15° 35' 15.28" E- 074° 11' 22.37"
12	Checkpoint Maloli	Maloli	Codal	N-15° 57 ' 85.66" E-074° 18' 87.66"

ANNEXURE- XVIII**Check posts, Chain barriers and antipoaching camps in Madei Wildlife Sanctuary.**

Sr. No.	Round	Location
1	Codal	Maloli
2		Nanoda
3		Codval
4	Caranzol	Govanem
5		Kadreghat
6	Charaumen	Surla
7		Gululem
8		Pali
9		Jamblikaden

Chaingates/Barriers in Madei Wildlife Sanctuary.

Sr.No.	Range	Location
1	Codal	Maloli (medicinal plot)
2		Maloli (post)
3		Chidambar
4		Nanoda (Deshmukhmala)
5		Shigonem
6		Codval
7	Charaunem	Surla (Near Devrai)
8		Pali
9		Jamblikaden
10	Caranzol	Caranzol (Poto)

ANNEXURES

Details of Anti Poaching Camp / Patrolling Camp

Sr. No	Type of Camp	Location
1	Anti Poaching Camp	Gullulem
2	Anti Poaching Camp	Surla
3	Anti Poaching Camp	Codval
4	Anti Poaching Camp	Assodem
5	Anti Poaching Camp	Thane
6	Anti Poaching Camp	Golauli
7	Anti Poaching Camp	Vagheri
8	Anti Poaching Camp	Parvad
9	Anti Poaching Camp	Rivem
10	Anti Poaching Camp	Codal

ANNEXURES**ANNEXURE- XIX****Details of Existing Roads and Treks in Madei Wildlife Sanctuary**

Sr. No.	Type of Road	Section	Length	Nature of road
1	Village road	Karmali Budruk Boundary to Kumthol Tali wada	1.5 km	Tar Road
2	Village road	Tali wada to Kumthol village bridge	2 km	Tar road
3	Forest Road	Dhatichimoli Rubber Plantation to Kumthol River	2.5 km	Earthen road
4	Village Road	Assodem Anti-Poaching Camp to Gawanem Check Post	3.5 km	Tar Road
5	Village Road	Gawanem Bridge to NimnichigalGawane	2.5 km	Tar Road
6	Village Road	Malpan Road to Farm Road	1.5 km	Tar Road
7	Village Road	Malpan Road to BSNL Tower old	1.5 km	Tar Road
8	Village Road	Shelpe Bus Stop to Nallaha	1.5 km	Tar Road
9	Village Road	Sigonem Nallaha to kelbai temple	1 km	Tar Road

ANNEXURES

10	Village Road	Sigonem Bridge to Codalkarwada	0.25 km	Tar Road
11	Village Road	Bharmakarmali Bus Stop to shelve village	1.5 km	Tar Road
12	Village Road	Satrem Bridge to Satrem temple	1.2 km	Tar Road
13	Forest Road	Satrem temple to Dhargarwada	2 km	Earthen road
14	Village Road	Derodem Bridge to Derodemwaddo	1 km	Tar Road
15	Forest Road	Devlachomol to Check post Codval	3 Rkm	Earthen Road
16	Forest Road	Vainguinim Gate to Vainguinim wado	3 R/km	Earthen road
17	Village Road	Nanoda Sakawada to near Shantadurga Temple Nanoda	200 mtr.	Tar Road
18	Village Road	Goa Police Camp Site to Vailowada Nanoda	200 mtr.	Tar Road
19	Village Road	DongariwadaNanoda to near Shantadurga Temple nanoda	700 mtr.	Tar Road
20	Village Road	Nanoda Aganwadi to Nanoda Sukadat	200 mtr.	Tar Road
21	Village Road	Nanoda Bambarwaddo	5 R/km	Tar Road

ANNEXURES

		to Check Gate Nanoda		
22	National Highway NH748AA	Gululem check post to Jamlikadesai Temple Gululem beat boundary	6.4 km	Tar Road
23	Village Road	Surla bridge to Check post Surla	1.730 km	Tar road
24	Village road	Kumthol Bridge to Caranzol Temple	2 km	Tar Road
25	Village Road	Kumthol Ground to Bandirwada	2 km	Paver Road
26	Forest Road	Bandirwada junction to Murkundi Area	1 km	Earthen Road
27	Village Road	Bandirwada junction to Bandirwada	1 km	Paver road
28	Forest Road	Bandirwada to Kaitin Area	2 km	Earthen Road
29	Forest Road	Murkundi Area to Zadani Area	2.5 km	Earthen Road
30	Forest Road	Gauthan to Dagarwada	475 mtr.	Kaccha Road
31	Forest Road	Zambalikade Check Post to Pali Check Post	1.7 km	Paver Road
32	National Highway	View point to Goa Boarder	5 km	Tar Road

ANNEXURES

	NH748AA			
33	Forest Road	Vagheri Gate to Watch tower	6.5 km	Earthen road
34	Forest road	Chidambar temple to Salmani Boundary Rivem	4 R/km	Earthen road
35	Forest Road	Derodem to Acacia Plantation	1.2 R/km	Earthen road

Annexure XX

Compensation Notification

Date 08/05/2020
 Inform
 R.F.S. All
 ACF/2M.



Government of Goa,
 Forest Department
 Secretariat, Porvorim – 403 521

Tel Nos: (0832) 2419443/2419792/2419697

E-mail: usforest-sect.goa@nic.in

F.No.7-5-2005/FOR/104

Dated:-24/04/2020

Read:-Notification No. 7-5-2005/FOR/310 dated 14-08-2012.

NOTIFICATION

In supersession of Notification No. 7-5-2005/FOR/310 dated 14-08-2012, the Government of Goa is pleased to revise the “Scheme for grant of compensation on account of loss of human life, permanent disability or injury and/or damage to cattle or property caused by Wild Animals” herein after called “Compensation for damage by wild animals” in order to simplify the procedure for determination and timely disbursement of appropriate compensation to the affected person(s). The term ‘Wild Animal’ will be as defined in the Wild Life (Protection) Act, (Central Act 53 of 1972).

2. The compensation for damage by wild animals for causing death/ injury to human and loss to cattle/damage to property will be determined and paid based on the terms and conditions and the rates as mentioned below.

Table- I

The rate of compensation on account of loss of human life or permanent disability or injury caused by wild animals

S. No.	Injury/ loss to human life	Compensation
1.	Ex-gratia payment for death / injury to human life	
(a)	Death	Rs.10,00,000/-
(b)	permanent disability (viz. loss of limb, eye, etc.)	Rs.5,00,000/-
(c)	Injury other than permanent disability	Rs.1,00,000/-, or the entire cost of treatment whichever is less

Contd...2/-

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Table- II

The rate of compensation for loss of cattle or damage to property caused by wild animals

	Loss of cattle/ property	Maximum Compensation*
2.	Death of cattle	
(a)	Calf	Rs. 10,000/-
(b)	Local cow / buffalo / bullock	Rs. 25,000/-
(c)	Jersey Cow	Rs. 50,000/-
(d)	Pig / Sheep / Goat	Rs. 5,000/-
3.	Injury to cattle	Rs.15,000/-, or as per actual assessment, whichever is less
4.	Damage to House/ other property	Rs. 25,000/- or actual assessment, whichever is less

Note: * The amount of actual compensation to be paid should take into account factors listed at para 4 (vi) below and in no case should exceed the maximum amount notified in the table-II of the notification.

3. In respect of any other item not mentioned above, the DCF concerned shall decide the amount on merit after examining the case submitted by the RFO.

4. The procedure for assessment of amount of loss / damage and grant of compensation-

- (i) The Compensation for attack on human being by wild animal will be admissible to bonafide residents of the area/ authorized visitors only if the incident has taken place inside any of the Wildlife Sanctuaries or National Parks. For attack outside Wildlife Sanctuary / National Park, the compensation shall be available to any person. However, in case of attack on cattle, the compensation shall be available even if the cattle was killed/ attacked inside Wildlife Sanctuary/National Park.
- (ii) The cases of compensation shall be dealt by concerned Park Manager/ Deputy Conservator of Forests (DCF) (Wildlife & Eco-tourism) and the Range Forest Officer (RFO) (Wildlife) in case the incident has taken place within Wildlife Sanctuary / National Park or within Eco-Sensitive Zone of that particular Wildlife Sanctuary/National Park. For cases occurring beyond Eco Sensitive Zone, concerned DCF (Territorial) and the RFO (Territorial) shall deal the case.

Contd...3/-

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- (iii) The investigation in the incidence of attack by wild animal shall be initiated as early as possible by concerned RFO on receipt of the information. For the purpose of assessment of the loss/damage caused to the livestock/other property such as house, huts, livestock sheds etc., the applicant should report the claim to the nearest RFO of the Wildlife Division/ Territorial Division, as the case may be, within 3 days of the incident. The RFO shall forward the same immediately to the DCF alongwith his/her report and Damage Assessment Report from Veterinary Officer (in case of cattle etc.) / Assistant Engineer, PWD (in case of house and other property).
- (iv) In cases of loss of human life, concerned DCF shall investigate the case and arrange to obtain the post mortem report from the Authorized Medical Officer and on satisfying on genuineness of the claim shall arrange to pay the compensation to affected person(s) within maximum 3 working days after receipt of post-mortem report. The compensation for loss of human life shall be granted in the following order of preference to:
- (a) Wife or husband, as the case may be.
 - (b) Sons, unmarried or divorced daughters (equal share).
 - (c) Daughters (equal share).
 - (d) Grand children being children of sons or daughters (equal share).
 - (e) Father or mother.
 - (f) In case of any dispute as per the succession certificate issued by the competent authority.
- (v) In case of death of cattle suspected to be caused by wild animals, the owner of the cattle shall submit the claim to the RFO alongwith the post-mortem report from the concerned Government Veterinary Officer within 3 days. The concerned nearest Veterinary Officer shall visit the site within 48 hours of the receipt of complaint and furnish certificate to the owner mentioning loss in Rupees taking various parameters mentioned at (vi) below.
- (vi) The maximum amount of compensation to the owner/owners of the cattle due to the attack by wild animal has been given in Table-II. For determining the actual compensation payable in case of death or injury of cattle caused by wild animals, RFO shall record his finding that the death of the live-stock / cattle was entirely due to the attack by wild animal and not due to any other reason. The RFO shall record following information/ details in the report: —
- a) Age of the animal.
 - b) Milk yield of the animal in case of female.
 - c) Maintenance cost of the animal by the owner.
 - d) Quantity of the animal dropping.

Contd...4/-

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- e) Health of the animal or its disease status.
- f) Life history and productive capacity of the animal etc.

****Cattle** include cow (including cross-bred cow), bullock, buffalo, calf, pig, goat, sheep, etc.

- (vii) In cases of loss or injury of cattle/ damage to property, concerned DCF shall investigate the case and on satisfying on genuineness of the claim, shall arrange to pay the compensation to affected person(s) within maximum 3 working days after receipt of post-mortem report.

5. The expenditure shall be debitable under the appropriate Scheme/Head of Account of the Forest Department and arranged to be paid by the DCF/ Divisional Head.

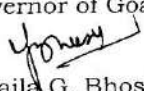
6. To ensure immediate disbursement of compensation, an interest-bearing account dedicated for **"Wildlife Compensation Fund"** shall be opened under Goa Forest Development Corporation with initial corpus of Rs. 25 lakh. For this purpose, the Government shall provide fund from the appropriate budget- head of Forest Department or otherwise, which shall be recouped from time to time. This Wildlife Compensation Fund may also receive donation from corporate houses/societies.

7. After receipt of recommendations and sanction from concerned DCF, the Goa Forest Development Corporation shall affect the payment immediately in not more than 2 days from the **'Wildlife Compensation Fund'** to the affected party as recommended by DCF concerned.

8. DCF shall report all cases of loss/ damage by wild animals and payment of compensation to the Chief Wildlife Warden within three days of payment of compensation. The cases where time limits are exceeded due to any unforeseen circumstance, the same should be brought to the notice of the Chief Wildlife Warden.

This order issues with the concurrence of the Finance Department vide its U. O. No. 1400070882 dated 20-04-2020.

By order and in the name of the
Governor of Goa


(Shaila G. Bhosle)

Under Secretary (Forests)

To,

- 1. The Director (Printing & Stationery), Government Printing Press, Panaji with request to publish the notification in the next issue of Government Gazette.

Contd...5/-

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Copy to:-

1. The Principal Chief Conservator of Forests, Forest Department, Goa Van Bhawan, Old IPHB Complex, Altinho, Panaji-Goa.
2. All Heads of Departments/Officers.
3. The Conservator of Forests (Wildlife & Eco-tourism/ Conservation)
4. The Collector North Goa, Panaji.
5. The Collector, South Goa, Margao.
6. The Director of Agriculture, Panaji.
7. The Director of Animal Husbandry and Veterinary Services, Panaji.
8. The Director of Health Services, Panaji.
9. All Departments in the Secretariat.
10. The Director of Accounts, Panaji.
11. All Deputy Conservators of Forests. (Wildlife & Eco-Tourism) (West)
12. The Joint Director of Accounts, Margao-Goa.
13. The Resident Audit Officer, Panaji.
14. P.S. to Chief Minister/Forest Minister, Secretariat, Porvorim.
15. P.S. to all Ministers, Secretariat, Porvorim.
16. P.A. to all Secretaries, Secretariat, Porvorim.
17. The Sr. Dy. Accountant General (Audit), Porvorim.
18. Guard file.
19. O/c.

Annexure – XXI**Details of Compensation paid to Claimants in regards to Cattle lifting and Human attack**

Sr. No	Year	Number of incidences (Nos)	Relief to Victim (Rs)	Loss of Livestock (Rs)	Remarks
1	2020	05		106000	<i>* Crop loss compensation is paid by Agriculture Department</i>
2	2021	04		143000	
3	2022	02		45000	
4	2023	02	4400	10000	
	Total	13	4400	304000	

ANNEXURES**ANNEXURE – XXII****List of Village / Hamlets along with human and Livestock population
within Boundary of Madei Wildlife Sanctuary.**

Sr. No	Village Names	Human Population	Livestock	
			Population	Immunize
1.	Savorsem	897	98	98
2.	Sonal	430	100	100
3.	Karmali Budruk	468	114	114
4.	Ustem	346	79	79
5.	Malpan	130	82	82
6.	Xelpo Curdo	280	41	41
7.	Charaundem	708	55	55
8.	Ivrem Buzruco	666	128	128
9.	Ivrem Curdo	218	80	80
10.	Golauli	285	73	73
11.	Rivem	154	33	33
12.	Dongurli	1534	474	474
13.	Pali	1157	292	292
14.	Naneli	294	181	181
15.	Zarmi	621	50	50
16.	Dabem	598	52	52
17.	Compordem	1232	723	723

ANNEXURES

18.	Vainguinim	32	NIL	NIL
19.	Nanoda	287	105	105
20.	Codval	11	NIL	NIL
21.	Nagargao	549	65	65
22.	Ambede	272	69	69
23.	Hedorem	291	60	60
24.	Surla	448	82	82

ANNEXURE-XXIII

Eco-Sensitive Zone Notification of Madei Wildlife Sanctuary

रजिस्ट्री सं० डी० एल०-33004/99

REGD. NO. D. L.-33004/99



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

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पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 25 फरवरी, 2015

का.आ. 616(अ).— भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय ने एक प्रारूप अधिसूचना का.आ. 632(अ) तारीख 3 मार्च, 2014 भारत के राजपत्र, असाधारण में प्रकाशित किया था, जिसमें गोवा राज्य के मेदई वन्य जीव अभयारण्य के चारों ओर पारिस्थितिकीय संवेदी जोन को प्रस्तावित किया गया, जिसके द्वारा उन सभी व्यक्तियों से, जिनके उससे प्रभावित होने की संभावना थी, उस तारीख से, जिसको भारत के राजपत्र में प्रकाशित रूप में उक्त अधिसूचना की प्रतियां जनता को उपलब्ध करा दी गई थीं, साठ दिन की समाप्ति के पूर्व आक्षेप और सुझाव मांगे गए थे;

और, उक्त अधिसूचना को अंतर्विष्ट करने वाले राजपत्र की प्रतियां 3 मार्च, 2014 को जनता को उपलब्ध कराई गई थीं;

और, प्रारूप अधिसूचना के जवाब में सभी व्यक्तियों तथा पणधारियों से प्राप्त सभी आक्षेपों और सुझावों पर केन्द्रीय सरकार द्वारा सम्यक् रूप से विचार कर लिया गया है ;

और, केन्द्र सरकार यह समझती है कि मेदई वन्य जीव अभयारण्य, सातारी, गोवा राज्य के उत्तरी गोवा जिले में 15° 40' 56.58" उत्तर और 15° 27' 12.64" उत्तर अक्षांश तथा 74° 16' 55.70" पूर्व और 74° 5' 2.58" पूर्व देशांतर के बीच स्थित है और 208.48 वर्ग किलोमीटर के क्षेत्र में विस्तृत है, जो जैव विविधता से समृद्ध वेस्टर्न घाट का आवश्यक भाग है ;

और, मेदई वन्य जीव अभयारण्य में अति संकटापन्न प्रजातियों जैसे भारतीय गैर, तेंदुआ, चूड़ा हरिण, जंगली कुत्तों आदि के अतिरिक्त अति महत्वपूर्ण प्रजाति अनु उत्तेजित सपुच्छ चमगादड़ भी पाए जाते हैं ;

और, इस अभयारण्य के वन वर्षा को आकृष्ट करते हैं और भूमिगत जलदायी स्तरों में जल को संचित करने में सहायता करते हैं और नदियों और घासों के विरुद्ध मृदा क्षरण को कम करके उनमें सिल्ट के भराव को रोकते हैं और बहुवार्षिक या अर्द्धवार्षिक या मौसमी प्रकृति की जल घासों का पूरा बंधा हुआ नेटवर्क चलता है जो मेदई नदी, अंजुनेम जलाशय और उसकी नहरों को भरता है ;

अतः, यह आवश्यक है कि मेदई वन्य जीव अभयारण्य के चारों ओर के संरक्षित क्षेत्र को पारिस्थितिकी और पर्यावरण के दृष्टिकोण से एक पारिस्थितिक संवेदी क्षेत्र के रूप में संरक्षित और संधारित किया जाए; जिसकी विस्तार एवं सीमाएं, इस

961 GI/2015

(1)

27.	वेलजिम
28.	श्रंगुली
29.	सिरसोडीम
30.	असोडीन
31.	जीलपो-करडो
32.	गोवानीम
33.	अमबेली
34.	मालपोना
35.	सुरला

उपाबंध 4

कृत कार्रवाई रिपोर्ट का प्रोफार्मा:-

राज्य स्तरीय पारिस्थितिक संवेदी जोन मानीटरी कमेटी.-

1. बैठक की संख्या और तारीख
2. बैठकों के कार्यवृत्त: प्रमुख रूप से उल्लेखनीय बिंदुओं का उल्लेख करें
बैठक के कार्यवृत्त को पृथक् उपाबंध पर संलग्न करें।
3. जोनल मास्टर प्लान जिसके अंतर्गत पर्यटन मास्टर प्लान (पारिस्थिति संवेदी जोन वार) भी है के तैयार किए जाने की स्थिति
4. उन मामलों का सार जिसके भू अभिलेख में प्रकट हुई त्रुटियों का सुधार किया जाना है। (पारिस्थिति संवेदी जोन वार)
जिसका विवरण उपाबंध के रूप में संलग्न किया जा सकता है
5. पर्यावरण समाघात निर्धारण अधिसूचना, 2006 (पारिस्थिति संवेदी जोन वार) के अधीन उन क्रियाकलापों के लिए जो सम्मिलित किए गए हैं संवीक्षा किए गए मामलों का सार।
6. पर्यावरण समाघात निर्धारण अधिसूचना, 2006 (पारिस्थिति संवेदी जोन वार) के अधीन उन क्रियाकलापों के लिए जो सम्मिलित नहीं किए गए हैं संवीक्षा किए गए मामलों का सार।
7. पर्यावरण (संरक्षण) अधिनियम, 1986 (पारिस्थिति संवेदी जोन वार) की धारा 19 के अधीन दर्ज किए गए परिवादों का सार।
8. कोई अन्य महत्वपूर्ण विषय।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
NOTIFICATION

New Delhi, the 25th February, 2015

S.O. 616(E).—Whereas, a draft notification, for declaration of Eco-sensitive Zone around Madei Wildlife Sanctuary in Goa, was published in the Gazette of India, Extraordinary, vide notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O. 632(E), dated 3rd March, 2014, inviting objections and suggestions from all persons likely to be affected thereby within a period of sixty days from date on which copies of the Gazette containing the said notification were made available to the public;

And Whereas, copies of the Gazette containing the said notification were made available to the public on the 3rd March, 2014;

And Whereas, all objections and suggestions received in response to the draft notification have been duly considered by the Central Government;

And Whereas, the Central Government considers that the Madei Wildlife Sanctuary, Sattari, Goa lying between latitudes 15° 40' 56.58" N and 15° 27' 12.64" N and longitudes 74° 16' 55.70" E and 74° 5' 2.58" E in the North Goa

District of Goa State and extending over an area of 208.48 square kilometres, is an essential part of the Western Ghats, which is rich in biodiversity;

And Whereas, the Wrington's free tailed bat is the species of vital importance in Madei Wildlife Sanctuary, besides some of the most endangered species like Indian gaur, panther, mouse deer, wild dogs, etc. are also found in this sanctuary;

And Whereas, the forest of this Sanctuary intercepts rainfall and helps recharge ground water aquifer and protects rivers and streams against siltation by minimising soil erosion and has a well knit network of streams spreading throughout, which are perennial or semi perennial or seasonal in nature, and feed into Madei river, Anjunem reservoir and its canals;

And Whereas, it is necessary to conserve and protect the area the extent and boundary of which is specified in paragraph 1 of this notification around the Madei Wildlife Sanctuary as Eco-sensitive Zone from ecological and environmental point of view and to prohibit industries or class of industries and their operations and processes in the said Eco-sensitive zone;

Now, Therefore, in exercise of the powers conferred by sub-section (1), clause (v) and clause (xiv) of sub-section (2) and sub-section (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby notifies an area to an extent of one kilometre of land or the water body, whichever is nearer to the boundary of the Madei Wildlife Sanctuary in the State of Goa, as the Eco-sensitive Zone, details of which are as under, namely:—

1. Extent and Boundaries of Eco-sensitive Zone.—(1) The extent of Eco-sensitive Zone shall be one kilometre of land or the water body whichever is nearer to the boundary of the Madei Wildlife Sanctuary within the State of Goa.

(2) The Eco-sensitive Zone is bounded on the North by Maharashtra State boundary, on the South by the boundary of Bhagwan Mahaveer Wildlife Sanctuary, on the East by the villages of Karnataka State and on the West by the Anjunem reservoir and its canals and areas of the villages of Sattari Taluka; the Mahadei river, a tributary of Madei River joins the Eco-sensitive Zone on the East and passes along the Eco-sensitive Zone boundary from the East towards West at few places and the Anjunem reservoir is within the Eco-sensitive Zone towards West.

(3) The map of Eco-sensitive Zone boundary is appended to this notification as **Annexure I**. List of latitudes and longitudes of prominent points on the boundary of the ESZ is appended to this notification as **Annexure II**.

(4) The list of villages falling within Eco-sensitive Zone is given at **Annexure III**.

(5) The list of villages given in Annexure III shall be further revisited and confirmed by the State Government while preparing the Zonal Master Plan.

2. Zonal Master Plan for the Eco-sensitive Zone.—(1) The State Government shall for the purpose of effective management of the Eco-sensitive Zone, prepare a Zonal Master Plan, within a period of two years from the date of publication of this notification in the Official Gazette, for the consideration and approval of the Ministry of Environment, Forests and Climate Change, Government of India in consultation with local people and all concerned State Departments, such as Environment, Forest and Wildlife, Agriculture, Revenue, Urban and Housing Development, Tourism, Rural Development, Irrigation and Flood Control, Mining and Public Works Department for integrating the ecological and environmental considerations into the said plan.

(2) The Zonal Master Plan shall provide for restoration of degraded areas, conservation of existing water bodies, management of catchment areas, watershed management, ground water management, soil and moisture conservation, needs of local community and such other aspects of ecology and environment that need attention.

(3) The Zonal Master Plan shall demarcate all the existing and proposed urban settlements, village settlements, types and kinds of forest, agriculture areas, horticultural areas, man-made heritage sites, natural heritage sites, mining leases in operation, lakes and other water bodies.

(4) The Zonal Master Plan thus prepared specific to this Eco-sensitive Zone shall be integrated into the regional plan for the State of Goa.

(5) The Zonal Master Plan shall contain the measures as may be specified by the Central Government or the State Government, for regulation of activities specified under column (2) of the table specified in paragraph 4.

(6) The Zonal Master Plan so prepared shall be co-terminus with the regional development plan.

(7) The Zonal Master Plan shall be a reference document for the State Level Eco-sensitive Zone Monitoring Committee (hereinafter referred to as the SESZMC), referred to in paragraph 5, for carrying out its functions of monitoring under the provisions of this notification.

3. Measures to be taken by State Government.—The State Government shall take the following measures for giving effect to the provisions of this notification, namely:—

(1) Forests, horticulture areas, agricultural areas, parks and open spaces earmarked for recreational purposes in the Eco-sensitive Zone shall not be used or converted into areas for commercial or industrial related development activities:

Provided that the conversion of agricultural lands within the Eco-sensitive Zone may be permitted on the recommendation of the SESZMC, and with the prior approval of the State Government, to meet the residential needs of

local residents, and for the activities listed at item numbers 24, 26, 28 and 31 in column (2) of the Table in paragraph 4, namely:-

- (i) Small scale industries not causing pollution,
- (ii) Rainwater harvesting,
- (iii) Cottage industries including village industries, and
- (iv) Eco-friendly cottages for temporary occupation of tourists such as tents, wooden houses, etc. for Eco-friendly tourism activities;

Provided further that no use of tribal land shall be permitted for commercial and industrial development activities without the prior approval of the State Government and without compliance to the provisions of Article of 244 of the Constitution of India or the law for the time being in force, including the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007) as amended time to time:

Provided also that any error appearing in the land records within the Eco-sensitive Zone shall be corrected by the State Government, after obtaining the views of SESZMC, once in each case and the correction of said error shall be intimated to the Central Government in the Ministry of Environment, Forest and Climate Change:

Provided also that the above correction of error shall not include change of land use in any case except as provided under this sub-paragraph.

(2) The catchment areas of all natural springs shall be identified and plans for their conservation and rejuvenation shall be incorporated in the Zonal Master Plan and the guidelines shall be drawn up by the State Government to prohibit development activities at or near these areas.

(3) The activity relating to tourism within the Eco-sensitive Zone which shall form part of the Zonal Master Plan shall be as under, namely:—

(a) all new tourism activities or expansion of existing tourism activities within the Eco-sensitive Zone shall be in accordance with the guidelines issued by the Central Government in the Ministry of Environment, Forest and Climate Change and by the National Tiger Conservation Authority, with emphasis on eco-tourism, eco-education and eco-development and based on carrying capacity study of the Eco-sensitive Zone;

(b) new construction of any kind shall not be permitted within the Eco-sensitive Zone except for eco-friendly accommodation like tents, wooden houses or thatched roofs for temporary occupation of tourists and for eco-friendly tourism activities;

(c) till the Zonal Master Plan is approved, development for tourism and expansion of existing tourism activities shall be permitted by the concerned regulatory authorities based on the actual site specific scrutiny and recommendation of the SESZMC.

(4) All sites of valuable natural heritage in the Eco-sensitive Zone such as the gene pool reserve areas, rock formations, waterfalls, springs, gorges, groves, caves, points, walks, rides, cliffs, etc. shall be identified and preserved and proper plan shall be drawn up for their protection and conservation, within six months from the date of publication of this notification and such plan shall form part of the Zonal Master Plan.

(5) Buildings, structures, artefacts, areas and precincts of historical, architectural, aesthetic, and cultural significance shall be identified in the Eco-sensitive Zone and plans for their conservation shall be prepared within six months from the date of publication of this notification and incorporated in the Zonal Master Plan.

(6) The Environment Department of the State Government shall draw up guidelines and regulations for the control of noise pollution in the Eco-sensitive Zone in accordance with the provisions of the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder.

(7) The Environment Department of the State Government shall draw up guidelines and regulations for the control of air pollution in the Eco-sensitive Zone in accordance with the provisions of the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder.

(8) The discharge of treated effluent in Eco-sensitive Zone shall be in accordance with the provisions of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) and the rules made thereunder.

(9) Disposal of solid wastes shall be as under:-

(i) the solid waste disposal in Eco-sensitive Zone shall be carried out as per the provisions of the Municipal Solid Waste (Management and Handling) Rules, 2000 published by the Government of India in the erstwhile Ministry of Environment and Forests *vide* notification number S.O. 908 (E), dated the 25th September, 2000 as amended from time to time;

(ii) the local authorities shall draw up plans for the segregation of solid wastes into biodegradable and non-biodegradable components;

(iii) the biodegradable material shall be recycled preferably through composting or vermiculture;

(iv) the inorganic material shall be disposed of in an environmentally acceptable manner.

(10) The bio-medical waste disposal in the Eco-sensitive Zone shall be carried out as per the provisions of the Bio-Medical Waste (Management and Handling) Rules, 1998 published by the Government of India in the erstwhile Ministry of Environment and Forests *vide* Notification number S.O. 630 (E), dated the 20th July, 1998 as amended from time to time.

(11) The vehicular movement of traffic shall be regulated in a habitat friendly manner and specific provisions in this regard shall be incorporated in the Zonal Master Plan and till such time as the Zonal master plan is prepared and approved by the Ministry of Environment, Forests and Climate Change, SESZMC shall monitor compliance of vehicular movement as per the rules and regulations in force.

4. **List of activities prohibited or to be regulated within the Eco-sensitive Zone.**-All activities in the Eco-sensitive Zone, shall be governed by the provisions of the Environment (Protection) Act, 1986 (29 of 1986) and the rules made thereunder and be regulated in the manner specified in the Table below, namely:—

TABLE

S.No.	Activity	Remarks
(1)	(2)	(3)
Prohibited Activities		
1.	Commercial Mining, stone quarrying and crushing units.	All new and existing mining (minor and major minerals), stone quarrying and crushing units are prohibited with immediate effect
2.	Setting up of saw mills.	Prohibited (except as otherwise provided) as per applicable laws.
3.	Setting up of industries causing water or air or soil or noise pollution.	Prohibited (except as otherwise provided) as per applicable laws.
4.	Commercial establishment of hotels and resorts.	New commercial establishment such as hotels and resorts shall be prohibited within the Eco-sensitive Zone with immediate effect.
5.	Commercial use of firewood.	Prohibited (except as otherwise provided) as per applicable laws.
6.	Establishment of new major hydroelectric projects.	Setting up of new hydro-electric power plants (dams, tunnelling, and construction of reservoir) and expansion of existing plants in the Eco-sensitive Zone is prohibited with immediate effect, except the micro hydel power projects (Up to 100KW) or the mini hydel power projects (from 101 to 2000KW), which would serve the energy needs of the local communities, subject to the consent of the concerned Gram Sabha and all other requisite clearances.
7.	Use or production of any hazardous substances.	Prohibited (except as otherwise provided) as per applicable laws.
8.	Discharge of untreated effluents and solid waste in natural water bodies or land area.	Prohibited (except as otherwise provided) as per applicable laws.
9.	New wood based industry.	No establishment of new wood based industry shall be permitted within the limits of Eco-sensitive Zone with immediate effect.
10.	Construction activities	New construction of any kind shall be prohibited within the Eco-sensitive Zone with immediate effect, except for the domestic needs of local residents including the activities listed at item numbers 26, 28 and 31 and in the case of activities listed at item number 24, the construction activity shall be regulated and kept at the minimum.
11.	Use of plastic carry bags	Prohibited (except as otherwise provided) as per applicable laws.
12.	Brick kilns	Prohibited (except as otherwise provided) as per applicable laws.
Regulated Activities		
13.	Felling of trees.	(a) There shall be no felling of trees on the forest or Government or revenue or private lands without prior permission of the competent authority in the State Government. (b) The felling of trees shall be regulated in accordance with the

		provisions of the concerned Central or State Act and the rules made thereunder.
14.	Commercial water resources including ground water harvesting.	(a) The extraction of surface water and ground water shall be permitted only for <i>bona fide</i> agricultural use and domestic consumption of the occupier of the land. (b) Extraction of surface water and ground water for industrial or commercial use including the amount that can be extracted shall require prior written permission from the concerned Regulatory Authority. (c) No sale of surface water or ground water shall be permitted. (d) Steps shall be taken to prevent contamination or pollution of water from any source including agriculture.
15.	Erection of electrical cables and telecommunication towers.	Promote underground cabling.
16.	Fencing of existing premises of hotels and lodges.	Regulated under applicable laws.
17.	Widening and strengthening of existing roads and construction of new roads.	Shall be done with proper Environment Impact Assessment and mitigation measures, as applicable.
18.	Movement of vehicular traffic at night.	Regulated for commercial purpose as per applicable law.
19.	Introduction of exotic species.	Regulated under applicable laws
20.	Undertaking activities related to tourism like over-flying the National Park area by hot-air balloons, etc.	Regulated under applicable laws
21.	Protection of hill slopes and river banks.	Regulated under applicable laws
22.	Discharge of treated effluents in natural water bodies or land area.	Recycling of treated effluent shall be encouraged and for disposal of sludge or solid wastes, the existing regulations shall be followed.
23.	Commercial Sign boards and hoardings.	Regulated under applicable laws.
24.	Small scale industries not causing pollution.	Non polluting, non-hazardous, small-scale and service industry, agriculture, floriculture, horticulture or agro-based industry producing products from indigenous goods from the Eco-sensitive Zone, and which do not cause any adverse impact on environment.
25.	Collection of Forest produce or Non-Timber Forest Produce (NTFP).	Regulated under applicable laws
26.	Eco-tourism activities including eco tourist lodges, restaurant and recreational facilities including spa, swimming pool, gymnasium in temporary structures made of cloth or wood or particle board such as tents etc.	As per Zonal Master Plan.
Promoted Activities		
27.	Ongoing agriculture and horticulture practices by local communities along with dairies, dairy farming, aquaculture and fisheries.	Permitted under applicable laws.
28.	Rain water harvesting.	Shall be actively promoted.
29.	Organic farming.	Shall be actively promoted.
30.	Adoption of green technology for all activities.	Shall be actively promoted.
31.	Cottage industries including village artisans, etc.	Shall be actively promoted.

5. **State Level Eco-sensitive Zone Monitoring Committee:**—(1) The Central Government in the Ministry of Environment, Forest and Climate Change, for effective monitoring of the Eco-sensitive Zones around National

Parks and Wildlife Sanctuaries, has constituted a Committee called the State Level Eco-sensitive Zone Monitoring Committee (SESZMC) for the State of Goa vide notification number S.O. 221(E), dated the 23rd January, 2015, published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) comprising of the following members, and to perform the following functions, namely:-

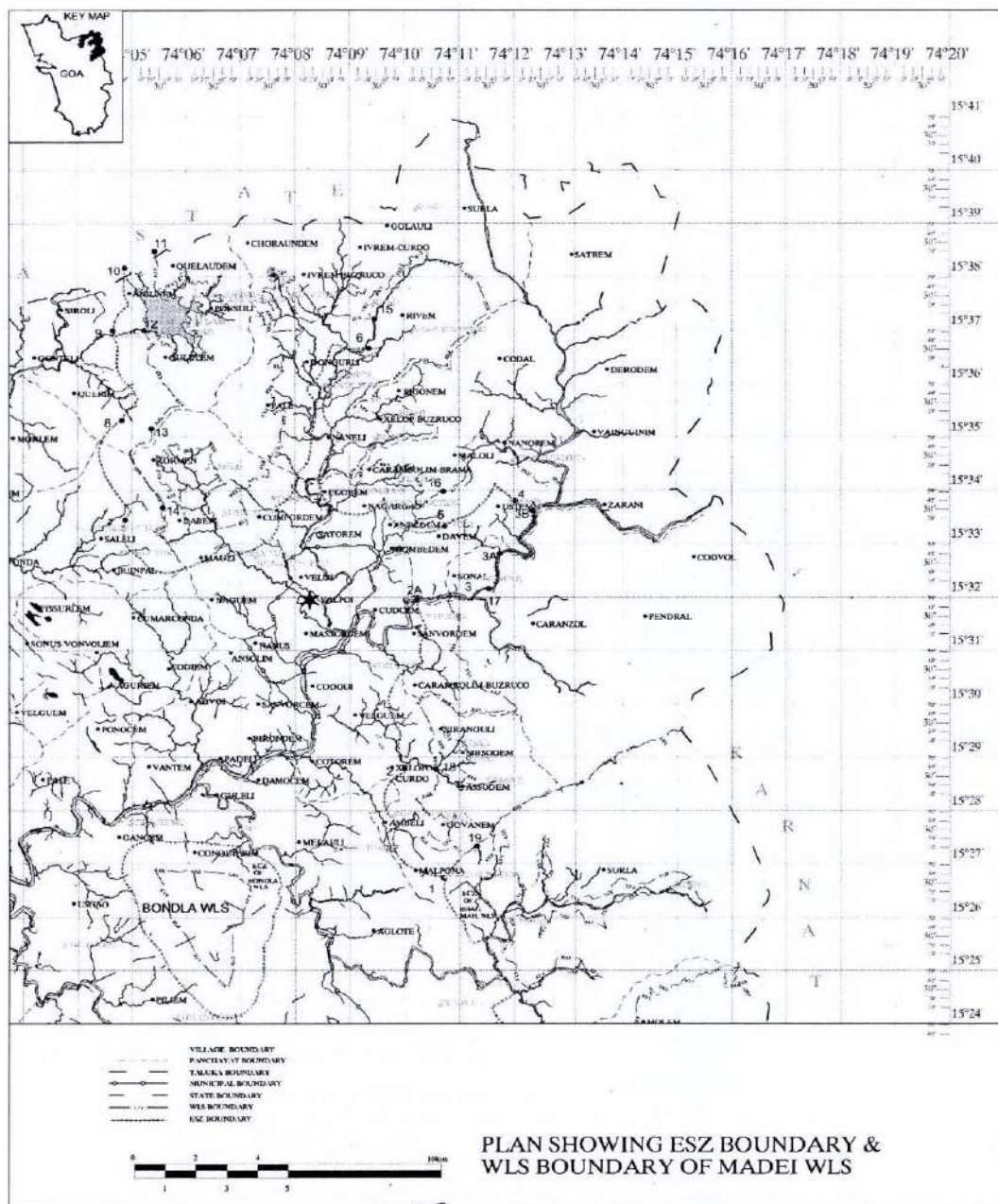
- (i) Chief Secretary, Government of Goa- Chairman;
 - (ii) Representative of the Ministry of Environment, Forest and Climate Change- Member;
 - (iii) Member Secretary, State Pollution Control Board-Member;
 - (iv) One representative of Non-governmental Organisations working in the field of environment to be nominated by the Government of Goa (for a term of one year)- Member;
 - (v) One representative of community based organisations nominated by the State Government (for a term of one year)- Member;
 - (vi-xiv) Principal Secretaries of the Government of Goa from Departments of Forest and Environment, Rural Development, Agriculture, Urban Development, Housing, Mining, Ports, Transport and Revenue – Members;
 - (xv) One expert in Ecology from reputed Institution or University of the State of Goa to be nominated by Government of Goa (for a term of one year) - Member;
 - (xvi) Chief Conservator of Forests (WL) and Chief Wildlife Warden, Government of Goa- Member Secretary.
- (2) The SESZMC shall monitor the compliance of the provisions of this notification.
 - (3) The activities that are covered in the Schedule to the notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O. 1533 (E), dated the 14th September, 2006, and are falling in the Eco-sensitive Zone, except for the prohibited activities as specified in the Table under paragraph 4 thereof, shall be scrutinised by the SESZMC based on the actual site-specific conditions and referred to the Central Government in the Ministry of Environment, Forest and Climate Change for prior environmental clearance under the provisions of the said notification.
 - (4) The activities that are not covered in the Schedule to the notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O. 1533(E), dated the 14th September, 2006 and are falling in the Eco-sensitive Zone, except for the prohibited activities as specified in the Table under paragraph 4 thereof, shall be scrutinised by the SESZMC based on the actual site-specific conditions and referred to the concerned regulatory authorities.
 - (5) The Member Secretary of the SESZMC or the concerned Collector or the concerned park in-charge shall be competent to file complaints under section 19 of the Environment (Protection) Act, 1986 against any person who contravenes the provisions of this notification.
 - (6) The SESZMC may invite representatives or experts from concerned Departments, representatives from Industry Associations or concerned stakeholders to assist in its deliberations depending on the requirements on issue to issue basis.
 - (7) The SESZMC shall submit the annual action taken report of its activities as on 31st March of every year by 30th June of that year to the Central Government in the Ministry of Environment, Forest and Climate Change as per pro forma given in Annexure IV.
 - (8) The Central Government in the Ministry of Environment, Forests and Climate Change may give such directions, as it deems fit, to the SESZMC for effective discharge of its functions.
6. The provisions of this notification shall be subject to the orders passed by the Hon'ble Supreme Court of India or the High Court or National Green Tribunal as the case may be, in respect of matters covered under this notification.

[F. No. 25/35/2013-ESZ-RE]

Dr. G. V. SUBRAHMANYAM, Scientist 'G'

Annexure I

Map of Madei Wildlife Sanctuary Eco-sensitive Zone showing Latitudes-Longitudes



Annexure II

List of latitudes and longitudes of prominent points on the boundary of the ESZ of Madei Wildlife Sanctuary

S. No.	Description	Latitude	Longitude
1	ROAD	15°26'51.80"N	74°10'12.72"E
2	ROAD	15°28'39.16"N	74° 9'54.27"E
2A	RIVER	15°31'54.55"N	74°10'2.95"E
3	RIVER	15°32'5.29"N	74°11'21.42"E
3A	RIVER	15°32'49.27"N	74°11'50.82"E
3B	RIVER	15°33'36.55"N	74°12'22.95"E
4	ROAD	15°33'40.55"N	74°11'54.37"E
5	ROAD	15°33'11.87"N	74°10'37.94"E
6	ROAD	15°36'31.11"N	74° 9'13.98"E
7	PADDY CENTER	15°33'17.55"N	74° 4'47.43"E
8	HILLY AREA	15°35'9.23"N	74° 4'43.38"E
9	ROAD	15°36'50.26"N	74° 4'33.07"E
10	END POINT	15°38'0.35"N	74° 4'45.76"E
11	WLS MAHARASHTRA BORDER	15°38'21.41"N	74° 5'29.24"E
12	WLS BOUNDARY	15°36'55.66"N	74° 5'20.41"E
13	WLS BOUNDARY	15°34'49.44"N	74° 4'48.60"E
14	WLS BOUNDARY	15°33'42.47"N	74° 5'38.06"E
15	WLS BOUNDARY	15°37'13.18"N	74° 9'25.19"E
16	WLS BOUNDARY	15°33'47.58"N	74°10'50.96"E
17	WLS BOUNDARY	15°32'5.29"N	74°11'21.42"E
18	WLS BOUNDARY	15°28'45.34"N	74°10'37.90"E
19	WLS BOUNDARY	15°27'15.04"N	74°11'16.98"E

Annexure III

List of villages falling within the Madei Wildlife Sanctuary Eco-sensitive Zone

List of Villages completely falling within the ESZ Boundary

S. No.	Village Name
1	Rivem

List of Villages partially within the ESZ Boundary

S. No.	Village Name
1	Anjunem
2	Ponsuli
3	Quelaudem
4	Gullullem
5	Querim
6	Zorme
7	Saleli
8	Bhuimpal
9	Dabem
10	Mauxi
11	Compordem
12	Naneli
13	Pale
14	Dongurli
15	Choraudem
16	Golauli

17	Edorem
18	Carambolim-Bramma
19	Nagargao
20	Ambedem
21	Satorem
22	Davem
23	Ustem
24	Maloli
25	Sanvordem
26	Carambolim-Buzrucco
27	Velguem
28	Siranguli
29	Sirsodem
30	Assodem
31	Xelopo-Curdo
32	Govanem
33	Ambeli
34	Malpona
35	Surla

Annexure IV

Proforma of Action Taken Report: - State Level Eco-sensitive Zone Monitoring Committee.-

1. Number and date of Meetings
2. Minutes of the meetings: Mention main noteworthy points. Attached Minutes of the meeting on separate Annexure.
3. Status of preparation of Zonal master Plan including Tourism master Plan (Eco-sensitive Zone wise)
4. Summary of cases dealt for rectification of error apparent on face of land record. (Eco-sensitive Zone wise).
Details may be attached as Annexure
5. Summary of cases scrutinized for activities covered under Environment Impact Assessment Notification, 2006 (Eco-sensitive Zone wise).
Details may be attached as separate Annexure.
6. Summary of case scrutinized for activities not covered under Environment Impact Assessment Notification, 2006 (Eco-sensitive Zone wise).
Details may be attached as separate Annexure.
7. Summary of complaints lodged under Section 19 of Environment (Protection) Act, 1986. (Eco-sensitive Zone wise).
8. Any other matter of importance.

ANNEXURE-XXIV**List of Nature Trail in Madei Wildlife Sanctuary**

Sr. No.	Locations	Approximate Length (km)
1	Pendral	02
2	Codal	02
3	Satrem(old bridge to mithachimal)	02
4	Satrem (SatremVillage to Dhangarwada)	02
5	Nanoda	01
6	NIC to Chidambar road	0.5
7	Maloli Office to CheckDam	0.5
8	Vainguinim	04
9	Surla	01
10	Surla	02
11	Surla	03
12	Vainguinim (Golaulim to chorla)	04
13	Ivrem (Village to waterfall)	01
14	Ivrem (Ivrem to Golaulim)	02

ANNEXURES**ANNEXURE-XXV****Proposed staff structure for management of Madel WLS**

Sr. No	Cadre	Existing Number of Posts	Proposed (in addition to existing)	Justification for additional requirement
1	Range Forest Officer	01	00	
2	Deputy Range Forest Officer	00	02	<i>For Overall assistance of Range Working</i>
3	Round Forester	03	03	<i>One for the Eco Tourism Complex , Maloli & 2 for additional Rounds</i>
4	Forest Guard	24	36	<i>One Guard to be deployed in each Beat, one at APC / inter state Check gate / Patrolling Squads</i>
5	Regular Labour	13	15	<i>For Maintenance of office Complex at Maloli / Surla & Codal & Nurseries</i>
6	Trekker	32	24	<i>One to be deployed in each Beat</i>
7	Temporary Status Labour	02	10	<i>For day to day works at APC. Patrolling Camp</i>
8	Sanitary workers	00	10	<i>At Eco Tourism sites</i>
9	Watch and Ward	00	20	<i>One to be deployed in each Beat</i>

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10	Lower Division Clerk	00	03	<i>For Office Work</i>
11	Peon	00	01	<i>For Office Work</i>
12	Sweeper	00	01	<i>For Office Work</i>
13	Watchman	00	03	<i>For manning the Eco Tourism Complex Maloli / Range Office</i>
14	Driver	00	08	<i>For departmental Vehicles (RFO, Tanker, Rescue Vehicle, Mini Truck, Utility Camper)</i>
15	Research Officer	00	01	<i>Post can be created in the wildlife & Eco Tourism division (North) to cater to all the three sanctuaries, i.e, Madei WLS, Bondla WLS and BMWLS & NP</i>
16	Research Assistant	00	03	

ANNEXURES**Annexure XXVI****Detail of Patrolling Pathways in Madei WLS**

Sr. No.	Beat	Section	Length
1	Caranzol I	Kumthol Kolmekade to Patyan	2 km
2	Assodem	Assodem Anti- Poaching Centre to Assodem Bhallan	3 km
3	Caranzol II	Caranzol Village to Talyar Waterfall	2 km
4	Caranzol IV	Kumthol Ground to Sateli	2 km
5	Caranzol IV	Murkundi Area to Ustem Bandara	5 km
6	Pendral	Pendral Tulskond to Sosogad way	5 km
7	Caranzol IV	Kumthol Waterfall to Potyan Area	2 km
8	Caranzol IV	Sateli to Potyan Area	2 km
9	Caranzol IV	Mhovacho Guno to Kanasgaal	2 km
10	Caranzol IV	Kanasgaal Junction to Kaitin	2 km
11	Vainguinim	Uwadat to sardakade	6 R /km
12	Vainguinim	Vadadat to dabolikoon	5 R/km
13	Vainguinim	Vainguinim to conegline	2 R/km
14	Vainguinim	Waterfall Area	1 R/km
15	Vainguinim	Waterfall Area	1 R/km
16	Vainguinim	Vainguinimwada to Chungal Waterfall	2 R/km
17	Vainguinim	Vainguinim Gate to Derodem Boundary	3 R/km
18	Nanoda	Mayat to Zadani	5 R/km

ANNEXURES

19	Nanoda	Maloli to Helipat	3 R/km
20	Codval	Codval check post to Namoguno	5 R/km
21	Codval	Kaltechowar to Devachikon	3 R/km
22	Codval	Sakhopanshiro to Shemachowor	4 R/km
23	Codval	Kaltechowar to check Post	3 R/km
24	Surla	Waterfall top to Surla check post	2.5 km
25	Surla	Delta to Waterfall top	2.5 km
26	Surla	Tiger trail to Dhangarwada	5 km
27	Surla	Surla Check Post to Khayla Surla	8 km
28	Surla	Delta back site to parwad Trail	6 km
29	Surla	Khayla Surla to Sidhichi Kon	5 km
30	Surla	Surla Check Post to Kaneli	4 km
31	Gululem	Gululem to Devasat	3 km
32	Gululem	Madayani to Vaterichi rai	2 km
33	Gululem	Dubrar to Pansuli	3 km
34	Gululem	Bambnachowaddo to Core Area	2 km
35	Ivrem	Patrolling Station Golauli to Juno Gava	5 km
36	Satrem	Satrem Village to Chikaliya Trail	7 km
37	Satrem	Satrem temple to Karnataka Boundary	8 km
38	Satrem	Old bridge to Siddhichi Kon	4 km
39	Satrem	Satrem Village to Satrem Old village	4 km

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40	Satrem	Satrem Village to Parwad	5 km
41	Codal	Vondar to Sakhaleshwar	8 km
42	Codal	Kukut to Saton	3 km
43	Codal	Codal junction to Rubber Plantation	2 km
44	Codal	Chidambar temple to Bat Cave	5 km
45	Codal	Range Office to Konani	3 km
46	Derodem	Phaysachya Mol to Vaigan rai	3 km
47	Derodem	Sakailey mol to Kosmat	3 km
48	Derodem	Vaigan rai to Dhagarmoll	4 km
49	Derodem	Mangachi Kon to Dhangarmol	4 km
50	Derodem	Waterhole to Karnataka Boundary	6 km
51	Derodem	Waterhole to Dhupachi rai	3 km

ANNEXURES**Annexure –XXVII****Details of *Acacia auriculiformis* plantation in Madei Wildlife Sanctuary.**

Sr. No.	Location	Round	Beat	Area	GPS Reading
1	Dam Side	Charaunde m	Gululem Beat	3hac	15°36'56.30"N 74°5'27.20"E 15°36'58.10"N 74°5'28.30"E 15°36'53.13"N 74°5'34.34"E 15°36'54.70"N 74°5'37.50"E 15°36'49.20"N 74°5'39.10"E 15°36'48.20"N 74°5'38.40"E
2	kerkarwa da	Caranzol	Caranzol - II Beat	0.6 Hac	15°29'47.99"N 74°12'5.62"E 15°29'46.09"N 74°12'5.94"E 15°29'45.25"N 74°12'6.19"E 15°29'42.43"N 74°12'6.98"E 15°29'41.58"N 74°12'6.61"E 15°29'39.45"N 74°12'6.30"E 15°29'40.48"N 74°12'7.55"E

ANNEXURES

					15°29'43.13"N 74°12'7.77"E 15°29'44.13"N 74°12'7.48"E
3	kerkarwa da	Caranzol	Caranzol - II Beat	1.35 Hac	15°29'22.04"N 74°12'18.48"E 15°29'23.25"N 74°12'14.11"E 15°29'26.52"N 74°12'13.99"E 15°29'32.11"N 74°12'8.77"E 15°29'34.26"N 74°12'7.57"E 15°29'35.26"N 74°12'9.65"E 15°29'34.36"N 74°12'9.32"E 15°29'31.54"N 74°12'10.05"E
4	Near watch tower	Charaunde m	Gululem Beat	4hac	15°36'59.11"N 74°6'25.10"E 15°36'58.80"N 74°6'23.70"E 15°36'55.50"N 74°6'22.20"E 15°36'53.50"N 74°6'25.20"E 15°36'50.10"N 74°6'26.20"E 15°36'50.20"N

ANNEXURES

					74°6'28.10"E 15°36'52.50"N 74°6'32.30"E
5	Shirsode mKerkarw ada	Caranzol	Assodem Beat	0.6 Hac	15°29'34.22"N 74°12'7.41"E 15°29'37.36"N 74°12'6.62"E 15°29'37.48"N 74°12'6.37"E 15°29'40.80"N 74°12'5.92"E 15°29'42.36"N 74°12'5.50"E 15°29'45.46"N 74°12'5.89"E 15°29'46.68"N 74°12'5.60"E 15°29'47.69"N 74°12'4.70"E 15°29'47.99"N 74°12'5.62"E 15°29'46.09"N 74°12'5.94"E 15°29'45.25"N 74°12'6.19"E 15°29'42.43"N 74°12'6.98"E 15°29'41.58"N 74°12'6.61"E 15°29'39.45"N 74°12'6.30"E

ANNEXURES

					15°29'34.33"N 74°12'7.53"E
6	Assodem	Caranzol	Assodem Beat	29 Hac	15°28'00.97"N 74°10'41.86"E 15°27'54.77"N 74°10'38.96"E 715°27'50.92"N 74°10'34.37"E 15°27'58.94"N 74°10'25.89"E 15°28'1.69"N 74°10'23.90"E 15°28'7.44"N 74°10'20.71"E 15°28'7.96"N 74°10'20.08"E 15°28'13.51"N 74°10'14.19"E 15°28'15.74"N 74°10'18.05"E 15°28'18.03"N 74°10'23.61"E 15°28'18.44"N 74°10'26.31"E 15°28'15.72"N 74°10'29.45"E 15°28'12.30"N 74°10'28.72"E 15°28'8.73"N 74°10'30.56"E 15°28'8.74"N

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					74°10'31.37"E
7	Caranzol III	Caranzol	Caranzol III Beat	1 Hac	15°31'58.93"N 74°13'0.06"E 15°32'2.42"N 74°12'52.93"E 15°32'5.46"N 74°12'51.39"E 15°32'5.65"N 74°12'51.83"E
8	Caranzol IV	Caranzol	Caranzol IV Beat	1 Hac	15°32'6.40"N 74°12'53.20"E 15°32'7.36"N 74°12'31.70"E 15°32'5.87"N 74°12'50.44"E 15°32'5.46"N 74°12'51.39"E
9	Chikalia Trail	Codal	Satrem Beat	6 Hac	15°38'13.00"N 74°14'42.48"E 15°38'30.86"N 74°14'45.77"E 15°38'24.96"N 74°14'41.07"E 15°38'19.25"N 74°14'36.09"E
10	Codal	Codal	Codal Beat	8.5 Hac	15°35'27.20"N 74°10'33.20"E 15°35'35.00"N 74°10'54.90"E 15°35'30.62"N 74°10'46.80"E

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					15°35'18.40"N 74°10'43.20"E
11	Gavonem	Caranzol	Assodem Beat	13 Hac	15°27'42.74"N 74°11'23.47"E 15°27'41.20"N 74°11'16.50"E 15°40'49.83"N 74°11'5.60"E 15°27'49.69"N 74°11'5.58"E 15°27'53.30"N 74°11'7.08"E 15°27'56.57"N 74°11'6.36"E 15°27'55.94"N 74°11'13.17"E 15°27'54.12"N 74°11'13.12"E 15°27'52.34"N 74°11'17.72"E 15°27'49.04"N 74°11'21.98"E
12	Golauli	Charaunde m	Ivrem Beat	5 Hac	15°38'49.40"N 74°9'13.30"E 15°38'52.70"N 74°9'7.80"E 15°38'58.30"N 74°9'11.20"E 15°38'57.70"N 74°9'13.30"E 15°38'56.40"N

ANNEXURES

					74°9'15.90"E 15°38'54.80"N 74°9'15.80"E 15°38'52.40"N 74°9'16.90"E 15°38'49.04"N 74°9'16.60"E
13	Gululem	Charaunde m	Gululem Beat	6.5 Hac	15°36'55.10"N 74°5'23.30"E 15°36'56.20"N 74°5'26.10"E 15°36'50.50"N 74°5'31.30"E 15°36'43.10"N 74°5'44.20"E 15°36'37.70"N 74°5'43.60"E
14	Lovakitam bdimatti	Charaunde m	Surla Beat	81 Hac	15°40'49.88"N 74°10'45.11"E 15°40'54.37"N 74°10'54.40"E 15°40'49.83"N 74°11'5.60"E 15°40'48.31"N 74°11'18.09"E 15°40'37.12"N 74°11'21.49"E 15°40'33.35"N 74°11'18.58"E 15°40'36.76"N 74°11'8.09"E

ANNEXURES

					15°40'23.67"N 74°10'45.62"E 15°40'24.21"N 74°10'35.51"E 15°40'16.93"N 74°10'31.15"E 15°40'13.70"N 74°10'30.75"E 15°40'16.46"N 74°10'27.51"E 15°40'23.68"N 74°10'32.88"E 15°40'29.03"N 74°10'28.70"E 15°40'33.77"N 74°10'33.86"E 15°40'37.79"N 74°10'36.66"E 15°40'32.48"N 74°10'42.88"E 15°40'34.58"N 74°10'46.86"E 15°40'43.89"N 74°10'39.43"E
15	Nanoda	Codal	Nanoda Beat	4 Hac	15°34'0.10"N 74°13'10.80"E 15°33'58.40"N 74°13'3.70"E 15°34'10.04"N 74°13'12.70"E 15°34'11.70"N

ANNEXURES

					74°13'15.40"E
16	Parwad Trail	Codal	Satrem Beat	10 Hac	15°37'52.85"N 74°13'11.12"E 15°38'5.10"N 74°13'3.90"E 15°38'14.28"N 74°13'6.53"E 15°37'53.08"N 74°13'16.78"E
17	Surla	Charaunde m	Surla Beat	48 Hac	15°39'49.05"N 74°10'16.02"E 15°39'51.43"N 74°10'18.49"E 15°39'57.02"N 74°10'22.22"E 15°40'2.72"N 74°10'28.67"E 15°39'41.43"N 74°10'35.92"E 15°39'40.02"N 74°10'40.88"E 15°39'32.17"N 74°10'34.53"E 15°39'30.37"N 74°10'31.67"E 15°39'23.38"N 74°10'32.14"E 15°39'21.57"N 74°10'27.78"E 15°39'26.33"N 74°10'22.20"E

ANNEXURES

					15°39'34.72"N 74°10'20.18"E 15°39'36.78"N 74°10'20.71"E 15°39'38.95"N 74°10'22.10"E 15°39'35.97"N 74°10'18.70"E
18	Copardem	Charaunde m	Pali Beat	3 Hac	15°34'19.73"N 74° 7'19.10"E
19	Vagheri	Charaunde m	Pali Beat	20 Hac	15°34'17.65"N 74° 7'18.59"E 15°34'17.32"N 74° 7'18.91"E 15°34'16.97"N 74° 7'19.00"E 15°34'17.18"N 74° 7'20.82"E 15°34'17.75"N 74° 7'22.00"E 15°34'18.38"N 74° 7'24.54"E 15°34'20.05"N 74° 7'25.58"E 15°34'21.98"N 74° 7'25.69"E 15°34'24.15"N 74° 7'22.85"E 15°34'21.76"N 74° 7'20.43"E 15°36'4.78"N

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					74° 6'40.98"E 15°36'8.50"N 74° 6'47.22"E 15°36'13.34"N 74° 6'52.61"E 15°36'12.96"N 74° 6'56.61"E 15°36'9.27"N 74° 6'58.28"E 15°36'3.85"N 74° 6'57.16"E 15°36'3.57"N 74° 6'56.04"E 15°35'59.25"N 74° 6'55.94"E 15°35'57.79"N 74° 6'53.73"E 15°35'57.23"N 74° 6'49.80"E 15°35'56.86"N 74° 6'44.07"E 15°35'56.04"N 74° 6'42.10"E 15°35'56.61"N 74° 6'40.25"E 15°35'57.49"N 74° 6'39.31"E 15°35'57.54"N 74° 6'38.23"E 15°35'59.87"N 74° 6'37.42"E
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ANNEXURES

ANNEXURE - XXVIII

SUMMARY OF BUDGET FOR MADEI WILDLIFE SANCTUARY

Category of expenditure	YEAR (Rs. In lakhs)										Total (Rs. In lakhs)
	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	
<u>Non-recurring Expenditure</u>											
Infrastructure, Protection And Communication	207.25	273.97	161.85	258.83	164.27	79.73	238.74	147.16	89.00	97.85	1718.65
Protected Area Management	37.56	46.62	51.15	56.14	61.63	67.67	74.31	81.62	89.66	98.50	664.84
Eco-Tourism Development	211.75	541.00	366.50	147.52	159.44	94.30	42.00	53.50	44.00	45.00	1705.01
Eco-development	51.00	53.30	61.88	80.72	51.21	54.55	95.58	64.53	71.18	76.35	660.29
Research, monitoring and training	40.10	39.11	23.29	19.91	24.82	26.56	41.36	42.24	40.72	33.33	331.44
Publicity and awareness	9.00	8.60	9.72	11.34	12.22	13.23	17.78	15.89	17.28	18.72	133.78
Total	556.66	962.60	674.39	574.46	473.59	336.04	509.77	404.94	351.84	369.75	5214.04

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<u>Recurring items of expenditure</u>											
Establishment cost	423.66	466.03	512.63	563.89	620.28	682.31	750.53	825.59	908.14	998.96	6752.01
Maintenance cost of permanent assets	73.55	65.61	89.27	79.54	86.81	93.52	120.08	106.78	145.66	126.72	987.54
TOTAL	497.21	531.64	601.90	643.43	707.09	775.83	870.61	932.37	1053.80	1125.68	7739.56
Grand total	1053.87	1494.24	1276.29	1217.89	1180.68	1111.87	1380.38	1337.31	1405.64	1495.43	12953.60

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE DEVELOPMENT OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

SR. No	Details of works proposed	Target (Fin - Rs. In lakhs)																				Total
		2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34		
		Ph y	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin	
A	Vehicle																					
1	Purchase of a newMahindra Thar Jeep for patrolling / Water Tanker			1.00	25.00					1.00	35.00			2.00	70.00					1.00	35.00	165.00
B	Wireless network																					0.00
3	Establishing a repeater station at Caranzol			1.00	3.50									1.00	5.00							8.50
4	Installing mobile / Static base station sets to the vehicles			10.00	15.00									10.00	20.00							35.00
5	Providing walkie-talkie			50.00	20.00									50.00	40.00							60.00
C	Telephone / Mobiles																					0.00
6	Providing landline telephone connection to Range office	1.00	0.25																			0.25
7	Broadband/ Intra net connection to office of DCF/RFO			1.00	1.00	1.00	1.00															2.00
8	Providing mobile telephone sets to DCF,ACF, RFO , Foresters & Forest Guards			20.00	5.00	20.00	5.00	20.00	5.00	15.00	3.75											18.75
D	Arms and ammunition																					0.00
9	Purchase of DBBL/slide action/Pump action guns & ammunition	LS			5.00				5.00						5.00						5.00	20.00
10	Purchase of revolvers for DCF, ACF and RFO			3.00	6.00																	6.00

ANNEXURES

E	Purchase of field equipments																				0.00
11	Digital cameras	LS	5.00				5.00						15.00								25.00
12	Binoculars	10.00	4.50			10.00	4.50	2.00	0.40	10.00	4.50			10.00	4.50			10.00	4.50		22.90
13	GPS instruments			10.00	5.00			10.00	5.00			10.00	5.00			10.00	5.00			10.00	25.00
14	Equipments required for census such (Trap Camera, Rescue Equipment's etc.)	LS	20.00		25.00		25.00		5.00		20.00		25.00		35.00		25.00		10.00	10.00	200.00
F	IT & Communication																				0.00
15	Purchase of computers , Laptops Printers/ Scanners etc			LS	15.00						20.00								30.00		65.00
16	Purchase of printers(2)and scanners(1) for office of ACF/RFO	1.00	0.30	1.00	0.20																0.50
17	Creation of integrated monitoring tower with long range cameras, night vision cameras, sound detector systems and intra net systems		50.00						50.00												100.00
18	Development of Mobile Apps for Patrolling, Reporting and Information & Technology upgradation (IT and Communicati on)	LS	10.00		20.00		5.00		5.00		10.00		8.00		8.00		8.00		8.00	10.00	92.00
F	INFRASTRUCTURE																				0.00
19	Construction of residential quarters for RFO , Madei at Maloli	1.00	60.00																		60.00
20	Construction of office building for Round Forester			1.00	35.00			1.00	40.00				1.00	50.00			1.00	50.00			77.00
21	Purchase of basic furniture for the newly established RF office	LS	5.00	LS	5.00			LS	5.00			LS	5.00			LS	5.00				25.00
22	Purchase of basic furniture for the established Beat office			LS	15.00	LS	15.00	LS	15.00												45.00

ANNEXURES

23	Construction of twin Forest guards quarters at Codal, Caranzol, Surla , Thane , Assodem , Nagargao, Vaiguinim			LS	30.00	LS	30.00	LS	30.00	LS	30.00												120.00
24	Maintenance of Staff quarters/ Camps	LS	5.00		10.00		5.00		12.00		15.00		18.00		20.00		25.00				30.00	140.00	
25	Construction of anti- poaching camp Vaiguinim, Kadredat (Permanent)			1.00	25.00	1.00	25.00															50.00	
26	Construction of anti- poaching camp sheds (temporary)	1.00	1.50	1.00	1.50	1.00	1.50	1.00	1.50		0.00	1.00	1.60		0.00	1.00	1.80		0.00		0.00	9.40	
27	Construction of staff quarters for one SDA and one driver at Maloli					1.00	24.00	1.00	24.00													48.00	
28	Improvement works for Anti- poaching permanent camp sheds with sanitation			2.00	6.00			5.00	10.00							15.00	15.00			7.00	1.20	32.20	
29	Providing basic implements to the camps such as torches, lanterns, solar lights, rain coats, gun boots etc	7.00	0.70	7.00	0.77	7.00	0.85	7.00	0.93	7.00	1.02	7.00	1.13	7.00	1.24	7.00	1.36	7.00	1.50	7.00	1.65	11.15	
30	Creation of solar powered pump and water hole circuit		20.00						25.00								35.00					80.00	
31	Procurement of night monitoring systems including IR drones, sound detector systems and training of personnel in it		15.00						20.00								25.00					60.00	
32	PPE, Shoes, Uniform, Weapons and tools for Field staff.		10.00				15.00				25.00				30.00				35.00			115.00	
	Total		207.25		273.97		161.85		258.83		164.27		79.73		238.74		147.16		89.00		97.85	1718.65	

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE PROTECTED AREA MAMANGEMENT OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

Sl. No	Details of works proposed	Target (Fin - Rs. In lakhs)																						Total
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34			
			Ph y	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin		
A	Boundary consolidation																							
1	Maintenance of D line	km	20.00	2.00	20.00	2.20	20.00	2.50	20.00	2.80	20.00	1.61	20.00	1.77	20.00	1.95	20.00	2.14	20.00	2.36	20.00	2.59	21.92	
2	Survey and demarcation of wildlife sanctuary, beats, private lands, enclosures etc	km	2.00	1.20	20.00	1.32	20.00	1.45	20.00	1.60	20.00	1.76	20.00	1.93	20.00	2.13	20.00	2.34	2.00	2.57	20.00	2.83	19.13	
3	Installing RF stones, cairns, boards etc,	no.	25.00	2.50	25.00	2.75	25.00	3.00	25.00	3.30	25.00	3.50	25.00	3.85	25.00	4.25	25.00	4.70	25.00	5.20	25.00	5.72	38.77	
B	Maintenance of road network																							
4	Repair and maintenance of Forest Roads	km	7.00	4.20	7.00	4.20	10.00	6.60	15.00	9.60	25.00	18.00	10.00	7.00	15.00	13.50	35.00	35.00	7.00	7.00	25.00	28.75	133.85	
5	Laying out new bridal paths of 1.5 M width with required earthwork and metal carpeting	km	-	0.00	5.00	2.50	5.00	2.75	5.00	3.02	5.00	3.30	5.00	3.66	5.00	4.02	5.00	4.42	5.00	4.87	5.00	5.35	33.89	
6	Maintenance of existing patrolling paths	km	10.00	2.50	20.00	5.50			10.00	3.50	10.00	3.85	10.00	4.23	10.00	4.60			20.00	10.25	20.00	11.27	45.70	
7	Construction of bridges and culverts/ causeways	no.	-	0.00	4.00	4.00	4.00	4.40	4.00	4.84	4.00	5.32	4.00	5.85	4.00	6.44	4.00	7.08	4.00	7.80	4.00	8.50	54.23	
8	Formation of new patrolling paths	km	-	0.00		5.00		2.00		2.50		2.00		5.00		3.00		5.00		5.00		5.00	34.50	
9	Clearance of beat paths	km	120.00	2.40	120.00	2.64	120.00	2.90	120.00	3.19	120.00	3.50	120.00	3.86	120.00	4.25	120.00	4.67	120.00	5.15	120.00	5.65	38.21	
10	Improvement of View lines	km	LS	10.00		10.00		10.00		10.00		10.00		10.00		10.00		10.00		10.00		10.00	100.00	

ANNEXURES

C	Fire Management															-		-		-		-	
11	Engaging fire watchers 40 Nos x 180 days	mand ays	7200.00	29.16	7200.00	32.07	7200.00	35.28	7200.00	38.81	7200.00	42.69	7200.00	47.00	7200.00	51.66	7200.00	56.82	7200.00	62.50	7200.00	68.75	464.74
12	Maintenance of fire lines	km	150.00	3.00	150.00	3.30	150.00	3.63	150.00	3.99	150.00	4.39	150.00	4.83	150.00	5.31	150.00	5.85	150.00	6.43	150.00	7.07	47.80
13	Creation & Maintanence of Fire Watchtower	Nos	1.00	20.00	3.00	66.00		10.00	2.00	50.00		10.00		10.00		5.00		5.00	2.00	80.00		4.00	260.00
14	Fire Fighting Equipements including water Tankers , Motorcycles	LS		10.00		35.00		50.00		25.00		10.00		15.00		25.00		25.00		20.00		20.00	235.00
	Participatory Fire Management	LS		10.00		10.00		11.50		11.50		13.00		13.00		15.00		15.00		18.00		18.00	135.00
D	Water Management																						
14	Formation of Water ponds	no.	1.00	1.00	1.00	1.10	1.00	1.21	1.00	1.33	1.00	1.46	1.00	1.61	1.00	1.77	1.00	1.95	1.00	2.14	1.00	2.36	15.93
15	Improvement of existing ponds	no.	2.00	0.60	2.00	0.66	2.00	0.73	2.00	0.80	2.00	0.88	2.00	0.97	2.00	1.06	2.00	1.17	2.00	1.29	2.00	1.41	9.57
16	Construction of gully checks	LS	500.00	20.00	500.00	22.00			500.00	26.62	500.00	29.28									500.00	38.65	136.55
17	Construction of check dams (Gabion & Loose boulders)	LS	-	0.00		5.00		7.00		10.00						12.00		15.00				20.00	69.00
18	Creation / Desilting of Waterholes	LS	-	5.00		5.00		5.00		5.00		5.00		5.00		5.00		5.00		5.00		5.00	50.00
E	Managing man-animal conflict																						0.00
19	Solar Fencing in agricultural lands along boundary of PA	LS				30.00		10.00		10.00		10.00		50.00		25.00		30.00		15.00			180.00
20	Compensation to victims of wildlife attack/ crop damage	LS																					0.00

ANNEXURES

F	Anti-poaching camps															-		-		-		-	
21	Establishment of Anti Poaching camps 5 Labour, Per camp x 12 camps x 240 days	no.	60.00	72.00	60.00	72.00	60.00	79.20	60.00	79.20	60.00	87.12	60.00	87.12	60.00	95.83	60.00	95.83	60.00	105.41	60.00	105.41	879.12
22	Ration for Anti- Poaching camp labours with one guard 5 labours x 12 camps – 300 Rs. Per Maz.	no.	60.00	10.00	60.00	10.00	60.00	10.00	60.00	10.00	60.00	11.00	60.00	11.00	60.00	12.10	60.00	12.10	60.00	7.20	60.00	7.20	100.60
G	Habitat improvement															-		-		-		-	
23	Creation of Grasslands	Ha			3.00	4.50			3.00	5.00			3.00		6.00			3.00	7.50				12.50
24	Maintenance of Grasslands	Ha	LS	3.00	LS	3.00	LS	3.00	LS	3.00	LS	3.00	LS	3.00	LS	3.00	LS	3.00	LS	3.00	LS	3.00	30.00
25	Enrichment plantations	Ha	5.00																				0.00
26	ANR	Ha			25.00	37.50	25.00	41.25	25.00	45.37			25.00	49.90	25.00	54.90	25.00	60.39	25.00	66.43			355.74
27	Removal of invasive weeds	Ha	50.00	7.50	50.00	8.25	50.00	9.10	50.00	10.00	50.00	10.10	50.00	11.11	50.00	12.22	50.00	13.44	50.00	14.78	50.00	16.26	112.76
28	Maintenance of existing plantations	Ha	LS	5.00	LS	5.00	LS	5.00	LS	5.00	LS	5.00	LS	5.00	LS	5.00	LS	5.00	LS	5.00	LS	5.00	50.00
29	Removal of Monoculture	Ha	25.00		25.00		25.00		25.00		25.00		25.00		25.00		25.00		25.00		25.00		0.00
30	Restoration of monoculture plantation with indigenous species	Ha	25.00	62.50	25.00	68.75	25.00	75.62	25.00	83.18	25.00	91.50	25.00	100.65	25.00	110.72	25.00	121.79	25.00	133.97	25.00	147.37	996.05
31	Wildlife monitoring, & Census of Flora & Fauna which includes Carnivore, Herbivore, Amphibians, Avian, Butterflies etc	LS		10.00		10.00		10.00		10.00		10.00		10.00		10.00		10.00		10.00		10.00	100.00
32	Raising of Bamboo plantation for fodder / restoration vulnerable slopes	Ha			10.00	5.00	10.00	5.50							30.00	24.00							34.50
TOTAL				37.56		46.62		51.15		56.14		61.63		67.67		74.31		81.60		89.66		98.50	664.84

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE ECO-TOURISM DEVELOPMENT OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

YEAR WISE BREAK UP OF FINANCIAL COST FOR THE ECO TOURISM DEVELOPMENT OF RAJDI WILDER RESERVATORY (2021-25 to 2033-34)																							
Sl. No	Details of works proposed	Target																					
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34		Total
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin	Fin
A	Establishment of Nature Camps at Surla & Maloli			Fin	Phy	Fin																	
1	Construction of Two reception centre cum security watchmen shed at the entrance	no.	-	0	2	20	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	20
2	Construction of nature merging welcome arches at the entrance of nature camps	no.	-	0	2	30	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	30
3	Construction of two Store Rooms	no.	-	0	2	20	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	20
4	Construction of tent bases with attached W/C and permanent roof for pitching tents	no.	-	0	12	36	12	36	2	7	2	7	0	0	0	0	0	0	0	0	0	0	86
5	Purchase of demountable ‘Swiss tent’ with latest design and accessories	no.	-	0	12	96	12	96	2	18.52	2	19.44	0	0	0	0	0	0	0	0	0	0	229.96
6	Purchase of latest type Tent accessories like rubber floor mat Cots, luggage box, furniture such as chairs, study tables	LS	-	0	12	60	12	60	2	12	2	15	0	0	0	0	0	0	0	0	0	0	147
7	Purchase of of Mattresses, bed sheets, bed covers, pillows, blankets, sleeping bags, door mats Sets x 3 sets per tent = 48 Sets	LS	-	0	12	120	12	120	2	20	2	20	0	0	0	0	0	0	0	0	0	0	280
8	Formation of concwood fencing of eco-friendly design/ compound wall at the entrance of the Nature Camp	LS	-	25	-	25	-	0	-	25	-	25	0	0	0	0	0	0	0	0	0	0	100
9	Construction of a raised platform and a Tank and Purchase of Pump and Laying of pipeline system	LS	-	0	2	20	-	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	20
10	Digging of a well and deepening of the existing well	LS	-	10	-	10	-	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	20

ANNEXURES

11	Construction of one golghar/ paragola for dining and activities	no.	1	7	1	7	-	0	-	0	-	0	0	0	0	0	0	0	0	0	0	14
12	Creating nature trails for nature interpretation such as waterfall trail, bird watching etc	LS	-	5	-	10	-	5	-	5	-	0	0	0	0	0	0	0	0	0	0	25
13	Construction of interpretation hall for group presentations, seminars, wildlife film shows and training class	LS	-	0	2	30	-	5	-	0	-	0	0	0	0	0	0	0	0	0	0	35
14	Laying out a waste disposal system by constructing sumps and completing the required plumbing work	LS	-	0	2	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
16	Maintenance of Trekking path	km	35	8.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.75
17	Formation of trekking paths	km	10	20	-	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	20
18	Establishing camping facilities at Codal Round	LS	-	0	0	0	0	0	-	35	-	35	0	0	0	0	0	0	0	0	0	70
19	Establishing camping facilities at Chaurandem round	LS	-	0	0	0	0	0	-	0	35	0	-	35	-	0	35	0	0	0	0	35
20	Establishing boards, signages for identification of flora and fauns	LS	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	5	-	50
21	Procuring souvenirs for the visitors such as T-shirts, Caps etc	LS	-	10	-	5	-	5	-	5	-	10	-	5	-	5	-	5	0	10	-	65

ANNEXURES

22	Education & awareness materials.	LS		3		5		5		0		5		0		10		10		5		0	43
23	Nature awareness camps	LS	5	5	5	5	7	7	7	7	8	8	8	8	9	9	9	10	9	10	9	10	79
24	Erection of signages at strategic location	LS		25		10		15					10				10					10	80
25	Training to staff and Community members on Visitor management	LS		1		1.5		1.5		1.5		2		2.5		3		3.5		4		5	25.5
26	Development of parking area	LS		12		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
27	Development of visitor amenities in the tourism areas.	LS		30		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
28	Conducting seminar, work shops annually and publish the report through EDC	LS		5		5.5		6		6.5		8		8.8		10		10		10		10	79.8
29	Conduct impact assessment & Carrying capacity study of visitation in the tourism areas	LS		5		0		0		0		0		10		0		0		0		0	15
30	Upgradation of Nature Interpretation Centre at Maloli	LS		35		0		0		0		0		0		0		0		0		0	35
31	Preparation implementation and revision of visitor management plan.	LS		0		0		0		0		0		10		0		0		0		0	10
										0		0				0		0		0		0	0
	TOTAL			211.75		541		366.5		147.52		159.44		94.3		42		53.5		44		45	1705.01

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE ECO- DEVELOPMENT OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

Sl. No	Details of works proposed	Target (Fin - Rs. In lakhs)																						Total
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34			
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin		
1	Formation of Eco- development committees and preparation & revision of micro plans	no.	-	0.00	4.00	4.00	5.00	5.00	4.00	5.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	14.00	
2	Eco-development activities (as per micro plan)	LS	-	5.00		5.50		6.00		6.50	-	7.00	-	7.50	-	8.00	-	8.50	-	9.00	-	10.00	73.00	
3	Providing smokeless Chullas and LPG connections pressure cookers to fringe villagers	no.	-	0.00	100.00	5.40	100.00	5.94	100.00	6.53	100.00	7.19	100.00	7.91	100.00	8.70	100.00	9.57	100.00	10.52	100.00	11.58	73.34	
4	Providing solar lanterns	no.	-	0.00	100.00	6.40	100.00	7.04	100.00	7.74	100.00	8.52	100.00	9.37	100.00	10.31	100.00	11.34	100.00	12.47	100.00	13.72	86.91	
5	Providing solar fence with 25% contribution in cash and labour components from the villagers	km	-	0.00	3.00	9.00	3.00	9.90	3.00	10.89	3.00	11.98	3.00	13.17	3.00	14.49	3.00	15.95	3.00	17.53	3.00	19.29	122.20	
6	Training to staff and EDC members on eco-development, micro planning etc.	LS		0.50		0.50		0.60		0.66		0.72		0.80		0.88		0.97		1.06		1.16	7.84	
7	Wildlife attack preventive measures.	LS		10.00		12.00		14.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00	36.00	
8	Study tour for the staff and EDC members to other protected areas	LS		3.50		3.50		5.00		5.00		6.00		6.00		7.00		7.00		8.00		8.00	59.00	

ANNEXURES

9	Improving the health and education status of EDCs	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
10	Study the extent and impacts of grazing	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
11	Vaccination of cattle & Livestock	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
12	Study the extent and impact of fire wood collection	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
13	Study the extent and impact of NWFP collection	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
14	Training on scientific collection of NWFP & value addition	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
15	Eco-development activities with focus on green economy, reintroduction efforts	LS		25.00						30.00						35.00							90.00
16	Socio economic survey of dependent communities/ EDCs	LS		1.00		1.00		1.20		1.20		1.40		1.40		1.60		1.60		1.80		1.80	14.00
	Total			51.00		53.30		61.88		80.72		51.21		54.55		95.58		64.53		71.18		76.35	660.29

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE RESEARCH, MONITORING AND TRAINING OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

Sl. No	Details of works proposed	Target (Fin - Rs. In lakhs)																						
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34		Total	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin	Fin	
	Study and document the RET species and asses the field status.	nos	-	5.00	-	5.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	10.00	
1	Conducting basic research such as survey of biological diversity, socio-economic conditions of the people in buffer zone etc	no.	1.00	1.50	1.00	1.65	1.00	1.82	1.00	2.00	1.00	2.20	1.00	2.42	1.00	2.66	1.00	2.92	1.00	3.22	1.00	3.54	23.93	
2	Conducting census of important species such as endangered mammals for monitoring	no.	1.00	5.00	-	5.00	-	0.00	1.00	5.00	-	5.00	-	0.00	1.00	5.00	-	5.00	-	0.00	1.00	5.00	35.00	
3	Training of staff in Eco- Tourism, wildlife laws etc with field visits	no.	3.00	2.00	3.00	2.20	3.00	2.40	3.00	2.66	3.00	2.92	3.00	3.22	3.00	3.54	3.00	3.90	3.00	4.28	3.00	4.75	31.87	
4	Purchase of training materials (Brochures, handouts, Posters, charts, Models), LCD projector, Generator Boards Charts etc./ and maintenance.	LS	-	3.00	-	3.50	-	4.50	-	5.00	-	6.00	-	7.00	-	7.50	-	7.50	-	9.00	-	9.00	62.00	
5	Training to school children through field exposure	no.	3.00	1.50	3.00	1.66	3.00	1.82	3.00	2.00	3.00	2.20	3.00	2.42	3.00	2.66	3.00	2.92	3.00	3.22	3.00	3.54	23.94	
6	Purchase of wildlife books and other related material for library at DCF office, Rfo Madei, Nature Camps at Surla & Maloli	LS	-	1.50	-	2.50	-	2.00	-	2.50	-	2.50	-	3.00	-	3.50	-	3.50	-	4.00	-	5.00	30.00	
7	Purchase of “Camera traps to find out the species present/ absent in the sanctuary by capture method	sets	25.00	10.00	25.00	10.00	25.00	10.00	-	0.00	-	0.00	-	0.00	25.00	15.00	25.00	15.00	25.00	15.00	-	0.00	75.00	

ANNEXURES

8	Study & document the traditional knowledge of indigenous communities	LS	-	2.00	-	0.00	-	0.00	-	0.00	-	3.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	5.00
9	Study the extent and impact of wildlife damage problems and crop involved.	LS	-	0.00	-	2.00	-	0.00	-	0.00	-	0.00	-	3.00	-	0.00	-	0.00	-	0.00	-	0.00	5.00
10	Conduct carrying capacity study.	LS	-	3.00	-	0.00	-	0.00	-	0.00	-	0.00	-	4.50	-	0.00	-	0.00	-	0.00	-	0.00	7.50
11	Study on the population dynamics, movement pattern, natality, mortality, habitat requirements and breeding biology of important Fauna viz Gaur, Tiger, Leopard Sambhar etc	LS	-	5.00	-	5.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	10.00
12	Training to staff and EDC members on weapon handling, fire fighting, census technique etc.	LS	-	0.60	-	0.60	-	0.75	-	0.75	-	1.00	-	1.00	-	1.50	-	1.50	-	2.00	-	2.50	12.20
	Total			40.10		39.11		23.29		19.91		24.82		26.56		41.36		42.24		40.72		33.33	331.44

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE PUBLICITY AND AWARENESS OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

Sl. No	Details of works proposed	Target (Fin - Rs. In lakhs)																					Total	
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34			
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin		
1	Preparation of brochures, books , charts, publicity materials etc.,	LS		3.00		1.50		1.50		2.00		1.46		1.61		5.00		1.95		2.14		2.36	22.52	
2	Preparation of cards, stickers, etc. for publicity	LS		1.00		1.10		1.22		1.34		1.76		1.62		1.78		1.94		2.14		2.36	16.26	
3	Celebration of wildlife week, Vanmahotsava and other such occasions like bird walks, Herpato walks etc	LS		5.00		6.00		7.00		8.00		9.00		10.00		11.00		12.00		13.00		14.00	95.00	
	Total			9.00		8.60		9.72		11.34		12.22		13.23		17.78		15.89		17.28		18.72	133.78	

ANNEXURES

YEAR WISE BREAK UP OF FINANCIAL OUTLAY FOR THE ESTABLISHMENT COST OF MADEI WILDLIFE SANCTUARY (2024-25 to 2033-34)

Sr. No	Details of works proposed	Target (Fin - Rs. In lakhs)																				Total	
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34		
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy		Fin
1	Salaries and allowances for the proposed staff	LS		380.60		418.66		460.53		506.58		557.24		612.96		674.26		741.68		815.85		897.43	6065.78
2	TA/Medical / DTE expenses of the staff	LS		38.06		41.87		46.05		50.66		55.72		61.30		67.43		74.17		81.58		89.74	606.58
3	Office expenses for the office of DCF/ ACF/ RFO,	LS		5.00		5.50		6.05		6.65		7.32		8.05		8.85		9.74		10.71		11.78	79.65
	Total			423.66		466.03		512.63		563.89		620.28		682.31		750.53		825.59		908.14		998.96	6752.01

ANNEXURES

MAINTENANCE COST OF PERMANENT ASSETS MADEI WILDLIFE SANCTUARY

Sl. No	Details of works proposed	Target (Fin - Rs. In lakhs)																						Total
		UNIT	2024-25		2025-26		2026-27		2027-28		2028-29		2029-30		2030-31		2031-32		2032-33		2033-34			
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Ph y	Fin	Phy	Fin	Phy	Fin	Ph y	Fin	Phy	Fin		
1	Maintenance of Anti poaching camp sheds	no.	11.00	9.00	11.00	9.00	11.00	16.50	11.00	16.50	11.00	16.50	11.00	22.00	11.00	22.00	11.00	22.00	11.00	28.00	11.00	28.00	189.50	
2	Maintenance of Buildings (RFO Quarter, Forester Quarters, Guard Quarters) depending on requirement	no.	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	5.00	20.00	200.00	
4	Maintenance of vehicles(DCF vehicle, RFO vehicle and staff patrol vehicle	LS		10.00		11.00		12.10		13.30		0.51		14.63		16.10		17.71		19.48		21.42	136.25	
6	Supply of ammunition (Twelve bore cartridges & 9mm pistol)	LS	-	1.00	-	0.00	-	2.00	-	0.00	-	0.00	-	0.00	-	5.00	-	0.00	-	0.00	-	0.00	8.00	
7	Supply of uniform to the staff	LS	-	10.00	-	0.00	-	11.00	-		-	15.00	-	0.00	-	18.00	-	0.00	-	25.00	-	0.00	79.00	
8	Supply of consumables to the staff such as batteries, torches etc	LS	-	5.00	-	6.00	-	7.00	-	8.00	-	9.00	-	10.00	-	11.00	-	15.00	-	18.00	-	20.00	109.00	
9	Office expenses for the office of DCF/ ACF/ RFO,	LS	-	6.00	-	7.00	-	8.00	-	9.00	-	10.00	-	11.00	-	12.00	-	16.00	-	19.00	-	21.00	119.00	
10	Maintenance of arms and wireless network	LS	-	2.00	-	2.00	-	2.00	-	2.00	-	5.00	-	5.00	-	5.00	-	5.00	-	5.00	-	5.00	38.00	
11	Payment of compensation for wild animal damage	LS	-	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	10.00	100.00	
12	Coordination activities such as inter departmental meetings, conferences, workshops	LS	-	0.05	-	0.06	-	0.06	-	0.07	-	0.07	-	0.08	-	0.09	-	0.10	-	0.11	-	0.12	0.81	
13	Immunization of cattle in the buffer zone	LS	-	0.50	-	0.55	-	0.61	-	0.67	-	0.73	-	0.81	-	0.89	-	0.97	-	1.07	-	1.18	7.98	
	Total		-	73.55		65.61		89.27		79.54		86.81		93.52		120.08		106.78		145.66		126.72	987.54	