

# CHAPTER 1

## INTRODUCTION TO THE AREA

### 1.1 NAME, LOCATION, CONSTITUTION & EXTENT OF AREA

Peppara Wildlife Sanctuary falls between 8° 34' and 8° 41'N latitude and 77° 6' and 77° 14'E longitude and is located in the Kerala state, Thiruvananthapuram district, Nedumangad taluk. The area was previously a part of Paruthippally Range of Thiruvananthapuram Forest Division and is presently under the Thiruvananthapuram Wildlife Division. Peppara wildlife sanctuary, spreading across an area of 53sq.km was constituted during the year 1983 vide GO (P) No. 379/83/AD dated 21-12-1983. It was declared as a wildlife sanctuary consequent to the construction of a dam at Peppara, in order to cater to the needs of drinking water purposes of Thiruvananthapuram and suburban areas. Out of the 53sq.km of the sanctuary area, 5.82sq.km is the water spread area of the reservoir.

### 1.2 APPROACH & ACCESS

Peppara Wildlife Sanctuary is nestled in the western slope of southern region of the Western Ghats i.e. in Nedumangad Taluk of Thiruvananthapuram District. It is located about 50kms east of Thiruvananthapuram city. The Headquarters of the sanctuary is Peppara. The nearest railway station is Thiruvananthapuram, 45kms from the sanctuary; nearest bus stations are Vithura 14kms & Thiruvananthapuram 45kms; and the nearest Airport is Thiruvananthapuram International Airport which is 55kms from the sanctuary.

### 1.3 BOUNDARY DESCRIPTION & CONDITION OF BOUNDARIES

Peppara Wildlife Sanctuary is having well defined natural boundaries. The sanctuary is lying more or less continuous with a vast stretch of reserved forests in Kerala and Tamil Nadu. The sanctuary is surrounded by Neyyar wildlife sanctuary in the Southeast, Agasthyavanam Biological Park in the West and Paruthippally Range in the Northwest. In the north, the boundary runs along the periphery of Bonaccord tea estate and Palode Range. In the east, it runs along the boundary of Kalakkad-Mundanthurai Tiger Reserve of Tamilnadu and meets the boundary of Neyyar Wildlife Sanctuary near Athirumala(*Map 1*). The outer boundaries of the sanctuaries are well demarcated and intact.

#### **1.4 ZONATION OF THE SANCTUARY**

Peppara Wildlife Sanctuary is presently divided into three zones namely Core, Buffer and Tourism(*Map2*). The **Core Zone** is located on the eastern part of the sanctuary and starts from Chathancode to the valleys lying between the reservoir and the state border. The core zone has forests on all four sides with the buffer zone on the western portion. The extent of the core zone is around 30sq.km which is about 60% of the total area and comprises of areas such as Chemmunjimottai, Koviltherimalai, Athirumala, Nachiyarmottai, Kannan kunnu, Kadirumudimalai etc. The Core zone is the region where human interference is strictly prohibited.

The **Buffer Zone** is located on the western portion of the sanctuary and occupies an area of around 23sq.km which is about 40% of the total area of the sanctuary. 5.82sq.km of this zone is the water spread area of Peppara Reservoir. All the 13 tribal settlements are located in this zone. The **Tourism Zone** overlaps with the buffer zone which needs to be strictly rationalized and sorted out.

#### **1.5 STATEMENT OF SIGNIFICANCE**

Peppara Wildlife Sanctuary with a wide variety of flora and fauna forms a part of the Agasthyamalai biosphere reserve and thus forms a critical component of a major conservational complex in the Western Ghats, which is one among the 34 biodiversity hotspots in the world. These protected areas in the Agasthyamalai hills comprise the Agasthyamalai Biosphere Reserve with a total extent of 3,500sq.km of which 1,828sq.km is in Kerala and 1,672sq.km in Tamilnadu. The Western Ghats, Agasthyamalai sub cluster, including all of Agasthyamalai Biosphere Reserve is under active consideration by UNESCO for enlisting it as a World Heritage Site. A large number of medicinal plants are present in the sanctuary, with many plants of medicinal importance still being discovered from the region. ‘Arogyapacha’ (*Trichopus zeylanicus*) which is widely distributed in the sanctuary is a sought after medicinal herb known for its anti fatigue properties. The sanctuary is an abode to a variety of rare, threatened and endemic species of flora and fauna of conservational importance.

Peppara Wildlife Sanctuary portrays bio-diversity and homogeneity of flora. The vegetation here is of diverse types which includes West coast tropical evergreen forest, Southern hilltop tropical evergreen forest, West coast semi-evergreen forest,

Southern moist mixed deciduous forest, Myristica swamp forest, Sub-montane hill valley swamp forest and Riparian forests etc. The Southern moist mixed deciduous forest is the major vegetation which is mostly found inside this reserve. Due to the presence of large number of medicinal plants, it has been declared as one of the 7 Medicinal plant conservation areas in Kerala. The MPCA has been named after the Agasthya peak, the second highest peak in South India. The area under MPCA comes to around 173ha. Under the MPCA programme, a demonstration plot for medicinal plants is also maintained at Manjadikunnu.

43 species of mammals, 233 species of birds, 46 species of reptiles, 13 species of amphibians and 27 species of fishes, 97 species of butterflies are identified from the sanctuary. Major mammals which are found inside the sanctuary are Tiger, Leopard, Sloth Bear, Elephant, Sambar deer, Gaur etc. Western Ghat endemic species like Lion tailed macaque, Nilgiri Langur and Nilgiri Marten add to the faunistic wealth of the sanctuary. A variety of fish species, natural and as well as exotic are seen in the reservoir and includes species such as Filament barb, Tilapia, Silver fish, Cat fish, Eel etc.

The third highest peak in Kerala, Chummunjimotta(1717m) is situated in Peppara sanctuary. The patches of shola forests, a fragile ecosystem specific to this region in the sanctuary is rich in biodiversity. Pandipath, which is more or less a plateau in between Peppara and Kalakkad-Mundanthurai Tiger Reserve of Tamilnadu harbors a large population of wild Gaurs and is a favorite location for wildlife researchers and enthusiasts.

## **1.6 HISTORY OF PEPPARA DAM & BONNACORD ESTATE**

Spreading across 5.82sq.km, the **Peppara dam** was constructed across the Karamana River in 1983 to augment the water supply to Thiruvananthapuram city and the sub-urban areas. However, it was modified as a hydro electric project in 1996 generating 3MW of electricity. The sanctuary forms the catchment area of Peppara reservoir. The length of the dam is 438m with a height of 36.5m. The cubical capacity of the water that the Dam can withstand is 70mm<sup>3</sup>, FRL is 110.5mts and water spread area is 5.82sq.km.

The **Bonnacord Estate** is around 110 years old which was originally managed by the English, later on transferred to the present owner; the Mahavir company during 1972. The estate extends over 1500 acre of land with nearly 350 laborers working here. The major cultivation includes rubber and tea and the tea leaves collected are sold to another manufacturing unit since the company is in lock out. The visitors cross this estate to trek to Agasthyarkoodam. Every year thousands of people trek to Agasthyamala covering a distance of 24kms one way starting their journey from Bonnacord forest picket station

## CHAPTER 2

### BACKGROUND INFORMATION & ATTRIBUTES

#### **2.1 BOUNDARIES**

##### **2.1.1 External**

As per Notification No. G.O (P) No. 379/83/AD dated 21-12-1983 the boundary description is as follows:-

**North:** From the point where Vithura-Bonaccord road enters the catchments area of the Peppara dam, the boundary runs along the watershed boundary of the catchment area till it reaches the boundary of Bonaccord tea estate, from where it passes along the Southern boundary of the estate till it reaches the eastern boundary of the estate. From there it runs along the watershed boundary of Peppara reservoir to Chemmunjimottai.

**East:** From Chemmunjimottai the boundary runs along the inter-state boundary of Kerala and Tamil Nadu passing Arumukhamkunnu (1457 m.) till it reaches the Athirumala peak (1594 m.). From Athirumala peak the boundary runs along the watershed boundary between Neyyar Wildlife Sanctuary and Karamana river basin till it reaches Kadiramudimalai passing along the following peaks Nachiyadikunnu (988 m.), Kannan kunnu and Karimalakari (636 m.).

**South:** From Kadirumudi the boundary follows the watershed area of Peppara reservoir along the Agasthiavanam Biological Park till it reaches the Peppara dam.

**West:** Starting from the Peppara dam, along the left bank of the water spread area of the dam, excluding the plantation areas and including all the natural reserve portion in the catchments area, till it reaches the Vithura-Bonoccord road in the north passing through the following peaks: Orachankunnu, Vattaparakunnu, Kalluparakunnu (473m) and Pumadathu kunnu.

##### **2.1.2 Internal**

No internal boundaries other than fire lines are demarcated on the ground. Janda's have been constructed at those places where the boundary meets the private lands or human habitation.

## **2.2 GEOLOGY, ROCK, SOIL**

Precambrian metamorphic belonging to the Khondalite group is the dominant rock types in this area. Charnokite is also exposed at different locations. The occurrence of Chrysoberyl, a semiprecious gemstone in the area and its mining cases were reported during late 90's. Magnetite quartzite is also seen in this tract. The underlying rock is principally gneiss. The gneiss has undergone lateritic decomposition in regions of heavy rainfall. The foothills, at an elevation below 300m, are often capped with crops of hard laterite (G.S.I., 1976). The soil is almost loamy and assumes sandy or clayey character depending on the accumulation of wash on the surface. The depth of soil varies from place to place. In the valleys and low lying areas, where the wash from the surrounding hills accumulate, the soil is fairly deep and often assumes a dark color due to the presence of burnt or decomposing vegetable matter. In such places the soil is of friable and porous character and the trees that come up there flourish well. On the slopes of hills and on the elevated grounds subjected to heavy wash, the soil has a characteristic yellow or reddish yellow color. Such soils are generally stiff and heavy, being clayey and containing very little organic matter. On the top and higher slopes of hills, where the wash is excessive the ground is rocky and soil shallow and hard (G.S.I., 1976).

## **2.3 TERRAIN**

The terrain is undulating with elevation ranging from 100m to 1717m (Chemmunjiimottai). The major peaks of the sanctuary are Koviltherimalai(1313m.), Athirumala(1594m.), Nachiyadikunnu(957m.), Arumukhamkunnu (1457m.) and Kadirumudimalai. Except some isolated hillocks, the area generally falls in the moderately to highly undulating terrain units.

## **2.4 CLIMATIC ATTRIBUTES**

The climate is moderately hot and humid with moderate rainfall received during both the Southwest and Northeast monsoons.

### **2.4.1 Rainfall**

Rainfall is received during both the Southwest and Northeast monsoons with an average annual rainfall of 1200 to 2500mm. The southwest monsoon, which brings in the greater part of the rainfall bursts out normally about the first week of June and lasts still the end of August. A few pre-monsoon showers precede the monsoon in April and May. The heaviest rainfall in the year occurs normally in June and July.

The southwest monsoon is steady and gentle. The northeast monsoon prevails during September to November. Following the rains of northeast monsoon, in the latter half of December heavy winds begin to blow from east and causes serious damage to tree growth. This lasts for about two months.

**TABLE 1: RAINFALL MONTH WISE(MM)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2002	1.2	16.8	100.6	313.4	160.0	91.0	110.0	155.4	67.8	581.6	276.7	11.2
2003	3.8	21.1	102.8	276.8	131.0	234.6	353.8	129.0	29.0	587.8	286.6	8.0
2004	0.0	4.8	39.0	198.8	418.9	439.0	209.6	120.8	179.6	232.2	186.8	11.0
2005	24.0	0.0	71.0	450.1	221.2	241.8	327.2	52.4	206.4	311.2	227.6	121.0
2006	36.2	0.0	109.4	89.6	279.6	242.6	173.0	129.4	382.9	533.0	447.1	46.2
2007	0.0	0.0	3.0	170.6	151.9	315.4	293.0	221.4	326.4	367.2	174.8	23.8
2008	0.0	23.7	447.0	204.4	88.0	115.3	372.4	252.2	197.4	469.2	242.6	30.2
2009	18.0	0.0	108.6	61.6	140.8	137.2	247.1	90.8	273.0	166.1	258.2	61.0
2010	115.0	0.0	25.0	216.5	241.8	219.2	304.5	140.8	163.2	471.9	464.2	198.6
2011	62.8	85.4	39.0	188.8	75.2	277.0	105.6	100.4	118.8	149.1	200.7	199.6

Source: Meteorological Department

#### 2.4.2 Temperature

The sanctuary consists of two climatic regimes i.e. tropical and montane subtropical. The climate in the tropical area is moderately hot and humid. Diurnal variation in temperature is not more than 10°C. The maximum mean daily temperature in the plains during the hottest month of March is about 32°C while in the coldest month of January is about 20°C. The plains are generally hot and humid while the hills are usually cooler and drier. The maximum mean daily temperature of the upper Ghats during the hottest month is about (35°C.), while that in the coldest month of January is about 21°C. The mean maximum temperature of subtropical region is 24°C, and mean minimum is 21°C. February to May are the dry months and forest fires are common.

**TABLE 2: TEMPERATURE MONTH WISE(Mean Max) (°C)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2002	32.6	32.4	33.4	33.5	32.1	31.1	30.9	30.8	32.6	31.0	31.0	32.3
2003	32.8	32.6	33.1	33.8	33.5	32.4	31.2	31.5	33.0	31.6	31.6	32.9
2004	33.0	33.9	34.4	34.0	31.3	30.7	30.0	30.9	30.6	31.2	31.7	33.0
2005	32.8	34.0	34.3	32.9	33.2	30.9	30.2	31.8	30.9	31.7	30.6	31.3
2006	32.0	34.0	33.9	33.9	32.7	31.9	30.7	31.1	31.1	30.8	31.3	33.3
2007	33.0	33.1	34.1	33.8	32.8	31.2	30.2	30.7	30.7	31.2	32.0	32.2

<b>2008</b>	33.3	33.3	31.8	32.5	32.9	31.4	30.6	31.3	31.4	31.8	31.2	32.3
<b>2009</b>	33.1	33.9	34.3	34.1	33.5	31.0	30.4	31.2	31.1	32.3	31.5	32.5
<b>2010</b>	32.5	33.6	35.0	33.9	33.0	31.6	30.5	30.3	31.2	30.8	31.0	30.8
<b>2011</b>	32.1	33.0	33.9	33.4	32.9	31.2	30.7	31.1	31.0	32.5	31.3	31.9

**TABLE 3: TEMPERATURE MONTH WISE(Mean Min) (°C)**

<b>YEAR</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>
<b>2002</b>	22.4	22.7	23.6	24.6	24.6	23.7	23.5	23.0	23.2	23.0	23.0	22.3
<b>2003</b>	22.0	22.8	23.3	24.4	25.0	23.6	22.8	23.0	23.1	22.8	22.5	21.3
<b>2004</b>	21.4	21.9	23.6	23.9	22.6	23.2	23.5	23.6	23.7	23.9	23.5	22.6
<b>2005</b>	22.9	23.4	25.1	24.7	25.6	24.2	23.8	23.8	23.8	24.0	23.5	22.8
<b>2006</b>	22.5	22.9	24.7	25.5	25.0	24.2	23.3	23.4	23.5	23.1	22.5	21.7
<b>2007</b>	21.8	22.4	24.1	25.3	25.2	24.0	23.5	23.9	23.7	23.4	23.0	22.7
<b>2008</b>	22.3	23.2	23.8	24.7	25.1	23.9	23.3	23.6	23.0	23.8	23.3	22.6
<b>2009</b>	21.9	22.5	24.6	25.5	25.7	24.4	23.6	24.0	23.9	24.1	23.4	23.7
<b>2010</b>	22.4	23.5	24.7	25.6	25.5	24.2	23.4	23.5	23.9	23.9	23.5	22.7
<b>2011</b>	22.8	23.1	24.2	24.8	25.4	24.6	23.8	24.1	24.1	24.4	23.2	23.1

Source: Meteorological Department

## 2.5 WATER SOURCES

The sanctuary consists of several natural and artificial water sources to meet the needs of the wildlife. Water level in Peppara reservoir is shown in the table below.

**TABLE 4: WATER LEVEL IN PEPPARA RESERVOIR(Mts)**

<b>Year</b>	<b>1<sup>st</sup> March</b>	<b>1<sup>st</sup> April</b>	<b>1<sup>st</sup> June</b>	<b>1<sup>st</sup> October</b>	<b>1<sup>st</sup> December</b>
<b>2004</b>	101.90	100	103.55	104.45	104.45
<b>2005</b>	104.15	104.75	105.05	104.55	104.55
<b>2006</b>	103.45	102.50	103.75	104.50	104.35
<b>2007</b>	101.52	99.68	97.90	104.50	104.50
<b>2008</b>	102.40	102.85	101.80	104.50	104.50
<b>2009</b>	101.95	100.55	97.95	104.50	104.50
<b>2010</b>	102.70	100.90	104.20	104.60	104.80
<b>2011</b>	103.50	101.45	102.10	104.08	104.65

Source: Irrigation Department

### 2.5.1 Natural Sources

The sanctuary is blessed with an adequate supply of water, the main source being Karamana River draining into Peppara reservoir. Karamanayar, originates from Chemmujimotai. Seven micro and mini watersheds such as Karamana and Attayar, Karalakodukutthu, Neduvanathodu, Kaviyar, Todayar, Kuttayar, Attampuramthodu and the reservoir area constitute the Peppara reservoir catchments. Thiruvananthapuram city and the suburban areas get its supply of drinking water from the dams built across Karamana River at Peppara and Aruvikkara.

### 2.5.2 Artificial Sources

Over the past few years, the following **water holes** have also been developed to augment water resources in the sanctuary.

**TABLE 5: DETAILS OF EXISTING WATER HOLES**

SL.No	Water hole	Section	GPS Readings
1	Pandipath	Thodayar	N08*41'17.3" E077*10'23.7"
2	Pandipath	Thodayar	N08*4'17.0" E077*10'14.9"
3	Lathimota	Thodayar	N08*39'18.2" E077*11'00.6"
4	Manjadikkanam	Thodayar	N08*40'42.2" E077*09'33.6"
5	Manjadikkanam	Thodayar	N08*40'31.7" E077*09'20.3"
6	Karikkulathuvu kavu	Thodayar	N08*38'51.1" E077*10'06.02"
7	Koduppikkala	Thodayar	N08*38'30.2" E077*10'14.4"
8	Panniyankadu	Thodayar	N08*38'53.7" E077*10'10.0"
9	Pankattumothala	Thodayar	N08*39'06.1" E077*09'58.0"
10	Kodavan kuzhi	Thodayar	N08*39'26.1" E077*10'14.6"
11	Ottakkal appu	Thodayar	N08*39'12.4" E077*09'34.9"
12	Pavathikkal	Thodayar	N08839'32.4" E07*09'46.9"
13	Plamoodu	Athirumala	N08*36'17.8" E077*10'04.2"
14	Koniyanga	Athirumala	N08*35'32.5" E077*11'20.5"

15	Dravyamotta	Athirumala	N08*35'43.9" E077*11'43.3"
16	Ottakkallu	Athirumala	N08*38'40.8" E077*11'40.3"
17	Karamanayar	Athirumala	N08*39'06.5" E077*11'28.7"
18	Kunnatheri	Athirumala	N08*37'18.0" E077*11'59.1"
19	Njarakunnu	Athirumala	N08*38'37.5" E077*11'49.3"
20	Pecheriappu	Athirumala	N08*36'92.4" E077*10'40.4"
21	Vellamala	Athirumala	N08*36'42.5" E077*09'0.37"
22	Manjavallithodu	Athirumala	N08*37'48.6 E077*10'57.8"
23	Kudilinga	Athirumala	N08*37'40.5" E077*11'10.5"
24	Pandipath	Athirumala	N08*40'19.5" E077*11'52.2"
25	Thekkumtheri	Athirumala	N08*40'21.8" E077*11'45.7"

All these water holes are almost perennial and are permanently used by wild animals. In addition to this the following **check dams** have been constructed to meet the needs of wildlife.

**TABLE 6: DETAILS OF EXISTING CHECK DAMS**

SL.No	Check Dams	Section	GPS Readings
1	Chemmankala	Thodayar	N08*39'35.9" E077*09'34.1"
2	Mukkothivayal	Athirumala	N08*36'27.4" E077*11'21.7"
3	Pananpara	Athirumala	N08*36'30.8" E077*10'57.9"

## **2.6 RANGE OF WILDLIFE, STATUS, DISTRIBUTION & HABITAT**

### **2.6.1 Vegetation**

Due to varied climatic and topographic conditions, the sanctuary represents very remarkable diversity in vegetation. The floral diversity is very high with a relatively

high percentage of endemism. The sanctuary is home to several rare, endemic and threatened plants such as *Bentinckia condapanna*, *Poeciloneuron pauciflorum*, *Humboldtia unijuga*, *Eugenia floccose*, *Eugenia discifera*, *Ardisia missionis*, *Eria bonaccordensis*, *Janakia arayalpatra*, *Dialium travancorium*, *Semecarpus auriculata*, *Polyscias acuminata*, *Paphiopedilum druryi*, *Eulophia macrostachya*, *Eulophia cullenii*, *Hetaria ovalifolia*, *Chiloschista glandulosa*.

Vegetation of the area could be classified into:

- **Southern hilltop tropical evergreen forests**
- **West coast tropical evergreen forest**
- **West coast tropical semi evergreen forest**
- **Pioneer euphorbiaceous scrub**
- **Moist bamboo brakes**
- **Southern secondary moist mixed deciduous forest**
- **Myristica swamp forest**
- **Sub montane hill valley swamp forest**
- **Riparian forest**
- **Grasslands**
- **Southern subtropical hill forest**
- **Ochlandra reed brakes**
- **Bentinckia condapanna brakes**

#### **2.6.1.1 Southern Hilltop Tropical Evergreen Forests**

This type of forest is a stunted evergreen forest and is found on top of hills, ridges and is floristically rich and is mainly confined to altitude ranging between 1000m to 1300m above sea level. It is more or less an inferior edition of the wet evergreen forests of lower elevations. The height of trees seldom exceeds 20m and are heavily festooned with mosses, lichens and ferns. Although species like *calophyllum* are found here, height of trees are much lesser with shorter boles and crowns somewhat rounded with crooked branches. Trees don't attain much height mainly due to high

wind velocity and less favourable soil conditions. At an elevation of 1200m to 2000m, a transition may be found between this type of forest and the tropical wet evergreen forests.

The dominant species are mainly *Calophyllum polyanthum*, *Cinnamomum sulphuratum*, *Hydnocarpus alpine*, *Casearea macrocarpa*, *Elaeocarpus munronii*, *Garcinia cowa*, *Memeceylon sp*, *Syzygium sp*, *Litsea insegnis*, *Litsea oleoides*, *Litsea wightiana*, *Litsea coriacea*, *Actinodaphne malabarica*, *Neolitsea scrobiculata* etc.

The **upper storey** primarily consists of *Mesua nagassarium*, *Elaeocarpus tuberculatus*, *Gluta travancorica*, *Ficus tsjahela*, *Artocarpus heterophyllus* while the medium sized trees in the **middle storey** are the younger form of upper storey along with species such as *Syzygium cuminii*, *Cinnamomum verum*, *Carallia brachiata* etc. Shrubs and herbs like *Crotalaria calycina*, *Asystasia dalzelliana*, *Nilgirianthus heyneanus*, *Nilgirianthus warreensis*, *Leucas vestita* form the lower storey. The climbers commonly found are *Piper trioicum*, *Dioscorea wallichii*, *Elaeagnus conferata*, *jasminum cordifolium* while epiphytes like *Robiquetia rosea*, *Sirhookera latifolia*, *Remusatia vivipara*, *Dendrobium wightii* etc are also seen in this type of forest. This type of forests can be seen on the way to Chemmunjimottai from Bonaccord, Koviltheri malai, Draiyva mottai, near Athirumalai and on the ridges between Karamanayar and Vazhaparathiyar.

#### **2.6.1.2 West Coast Tropical Evergreen Forests**

This type of forest is found usually at elevations between 240 m to 1100 m and may extend sometimes even up to 1350 m with some variation in floristic composition. The West coast tropical evergreen forest occurs at higher slopes of the ridges along eastern border especially in the upper source of the Thodayar, Kuttiyar, Karamanayar, Vazhaparathiyar, Attayar and under the high peaks of Koviltheri malai, Arumukhamkunnu, Draivyamottai, Adiru malai, Nachiyadi kunnu and Kannan kunnu. This belt occurs as a continuous patch from the point of northeastern boundary of the sanctuary to Kannankunnu near Nachiyadikunnu. One of the outstanding features of the West Coast Tropical Evergreen Forest is the presence of an overwhelming majority of the plants which are woody and of large dimensions. Its vegetation consists of at least three tiers, the highest often attaining a height of 40 to 45 m. Very often the trees are buttressed at the base and the boles are clean, cylindrical, un-

branched at least up to two-thirds of their height and generally with a spreading or umbrella shaped crown at the top. The middle stratum is more or less candle shaped and the lower characteristically conical. The trees are normally with orchids, aroids, mosses, ferns and lichens. Not only the trees but the climbers and epiphytes are also woody. The under growth largely consists of woody plants, seedlings, shrubs and young woody climbers.

The **upper storey** consists of *Mangifera indica*, *Artocarpus hirsutus*, *Vateria indica*, *Vitex altissima*, *Dipterocarpus bourdillonii*, *Palaquium ellipticum*, *Cullenia exarillata*, *Terminalia bellerica*, *Gluta travancorica* etc. The **middle storey** consists of species such as *Cinnamomum verum*, *Gordonia obtuse*, *baccaurea courtallensis*, *Canarium strictum*, *Hydnocarpus alpine* etc.

The **lower storey** comprises of species such as *Arenga wightii*, *Ixora arborea*, *Atalantia wightii*, while the ground floor consists of *Isonandra lanceolata*, *Pogostemon paniculatus*, *Glycosmis cymosa*, etc. Along the margin of streams large formations of *Ochlandra travancorica* and *Ochlandra wightii* are seen.

### **2.6.1.3 West Coast Topical Semi Evergreen Forests**

This type of forest is intermediate between the tropical evergreen and moist deciduous and generally considered as a transitional stage from evergreen to moist deciduous. It is found between 600 to 800 m elevation and in some areas descends up to 500 m. These may be mainly due to the change in environment or human interference or both. This type of the forest in the sanctuary is found adjoining the evergreen forest, mostly along the lower slopes which were subjected to heavy human interferences in the past.

The West Coast Semi-evergreen Forest accordingly forms a close high forest, the dominant trees sometimes running to big dimensions but is usually inferior to that of the Tropical Evergreen. This forest type includes both the evergreen and deciduous trees, with the evergreen species dominating. The bigger trees continue to be frequent in this forest and occur in both evergreen deciduous trees. The bark tends to be thick and rough. The density of the canopy in this type is less than that of the evergreens, but the canopy is well developed with stratification. Climbers are seen in abundance

and the undergrowth is more of coppice. The epiphytes usually met with are chiefly ferns and orchids.

The **upper storey** comprises of species such as *Alstonia scholaris*, *Artocarpus heterophyllus*, *Baccaurea courtallensis*, *Calophyllum apetalum*, *Carallia brachiata*, *Madhuca neriifolia*, *Vateria indica*, *Vitex altissima* etc, while the **lower storey** consists of species like *Cinnamomum verum*, *Mallotus philippensis*, *Xanthophyllum arnottianum*, *Spondias indica*, *Bridelia retusa*, *Macaranga peltata*, *Gmelina arborea*, *Canarium strictum* etc.

Large areas on the ground are covered by *Costus speciosus* and *Globba ophioglossa* along with the herbs and shrubs like, *Miliusa wightiana*, *Desmodium pulchellum*, *Peperomia pellucida*, *Croton klotzschianus*, *Scleria terrestris* and *Thottea siliquosa*. The common climbers are *Sarcostigma kleinii*, *Adenia hondala*, *Butea parviflora*, *Calamus pseudotenuis*, *Calamus travancoricus*, *Strychnos minor*, *Entada rheedii* and *Piper longum*. Bamboo and reeds are fairly common along streams and adjacent areas. This type of forest mainly occurs at Podiyakala, Karumanpara, below Vellipara, near Pachanituval falls, below Nachiyadi kunnu and Kadiramudimalai.

#### **2.6.1.4 Southern Secondary Moist Mixed Deciduous Forests**

This is a closed high forest type with dominant species being primarily deciduous, which are mostly pronounced light demanders reaching up to a height of 30-35 m and with few evergreen species confining to the lower storey. This type of forest is found in almost all parts of the sanctuary mainly below 600m. The evergreen species confined to the lower storey gives the forest as a whole a more or less evergreen appearance most of the year, but their frequency of distribution is far too less. The chief feature of the moist deciduous forest is a leafless period in the dry season. During this season, the upper canopy is almost entirely leafless though there is often a good sprinkling evergreen in the undergrowth and shrub cover. Compared to the moist mixed deciduous forests and the secondary moist teak-bearing forests, secondary moist mixed deciduous forest area receives high rainfall. This region has the microclimate to support the evergreen forest. Bamboo is commonly seen in lowland areas near reservoir. Epiphytes are seen. Lianas are abundant. The trees mostly have rounded crown and tall cylindrical bole. Buttress formation is visible in some species. The trees in this type generally have thick bark, mostly fibrous and

fissured in multi-shapes. The characteristic feature of the moist deciduous forest is the leafless period in the dry season (March-April). An appreciable number of the deciduous trees, however, come into new leaf (and often flower) long before the monsoon when one would expect them to experience water stress.

Stratification is not so prominent in this type of forests. The **upper storey** comprises of species such as *Terminalia paniculata*, *Pterocarpus marsupium*, *Albizia odoratissima*, *Artocarpus hirsuta*, *Hopea parviflora*, *Lagerstroemia microcarpa*, *Dalbergia latifolia*, *Bridelia retusa*, *Grewia tiliifolia*, *Mitragyna parviflora* and *Vitex altissima* while the **middle storey** consists of *Dillenia pentagyna*, *Careya arborea*, *Lannea coromandelica*, *Wrightia tinctoria*, *Mallotus philippensis*, *Embllica officinalis*, *Cassia fistula* etc.

The ground is covered with dense growth of grass-like *Panicum maximum*, *Cyrtococcum oxyphyllum*, *Imperata cylindrica minor*, *Pennisetum polystachyon*, *Pseudanthistiria umbellata* and *Themeda cymbaria* while the climbers include *Salacia chinensis*, *Salacia fruticosa*, *Butea parviflora*, *Adenia hondala*, *Jasminum rottelerianum*, and *Dioscorea bulbifera*. Shrubs and herbs like, *Acrotrema arnottianum*, *Artabotrys zeylanicus*, *Impatiens latifolia*, *Crotalaria albida*, *Crotalaria prostrata*, *Desmodium heterocarpon*, *Desmodium laxiflorum*, *Rhynchosia cana*, *Tamilnadia uliginosa*, *Vernonia conyzoides*, *Asystasia gangetica*, *Curcuma aromatica*, *Zingiber zerumbet*, *Carex beccans*, *Carex filicina*, etc. are also seen in some areas. This forest type covers the sanctuary in almost all places mainly below 600 m.

#### **2.6.1.5 Pioneer Euphorbiaceous Scrub**

Before declaring the area as a sanctuary, the tribals used to migrate from one place to another practicing shifting cultivation. Fast growing but short lived euphorbiaceous species like, *Macaranga*, *Mallotus*, and *Trema* got quickly established in the abandoned areas and predominated as the first colonizers in the secondary vegetation providing shade and shelter under which the slower and less adaptable species of the later stages established to form the dominant vegetation. The pioneer euphorbiaceous scrubs were virtually nurse crops for the regeneration of characteristic species to follow after a lapse of some years, provided seed bearers were available within the vicinity.

This type of forest is found mainly in the southern part of the sanctuary where the tribal settlements are located. It also occurs below Nachiyarmottai and along the Muttuparathodu and comprises mainly of species like *Macaranga peltata*, *Mallotus tetracoccus*, *Mallotus philippensis*, *Trema orientalis*, *Symplocos macrophylla subsp. zeylanicus*, *Terminalia paniculata*, *Aporusa lindleyana*, *Tabernaemontana divaricata*, *Olea dioica*, *Ficus hispida*, *Albizia odoratissima*, *Actinodaphne bourdillonii*, *Euodia lunu-ankenda* and *Alstonia scholaris*.

#### **2.6.1.6 Myristica Swamp Forests**

This is a characteristic edaphic formation found in the bottom of valleys, which is subjected to inundation throughout the year. It is a unique forest type found exclusively in the plains and low elevations of the southern most part of the Western Ghats. These swamps are more localized and are seen only in the poorly drained regions with a very long rainy season. It is restricted to the sluggish streams as fringing forest below 300m elevations. The characteristic feature of this forest type is the abundance of the species of Myristicaceae family, particularly two species that are not common under other conditions, viz., *Gymnacranthera farguhariana* and *Myristica fatua magnifica*. The height of the forest is usually about 25 to 30m and the trees have comparatively clean and slender boles. The other common species are *Gymnacranthera farguhariana*, *Myristica dactyloides*, *Myristica malabarica*, *Myristica fatua*, *Knema attenuata*, *Calophyllum apetalum*, *Syzygium mundagam*, *Persea macrantha*, *Vateria indica*, *Carallia brachiata*, *Lophopetalum wightianum*, etc. On the edges of this forest are found *Mesua nagasarium*, *Holigarna arnottiana*, *Dimocarpus longan*, *Scolopia crenata*, *Hopea parviflora*, *Humboldtia vahliana*, etc.

This type of forest was first reported by Krishnamoorthy (1960) in the valleys of Shendurney, Kulathupuzha and Anchal ranges of Travancore. Champion and Seth (1968) have classified them into the subgroup 'tropical fresh water swamp forests'. These swamps, because of their location in low altitude, are under tremendous biotic pressure and their conservation is a challenging task and subjected to heavy degradation in various ways. This forest type is mainly found in Karikulathukavu near Cherukadu and also found in places such as Pangattumothala, Mlavettipara, Kaviyattumanpuram, Anachira, Pannumpara, Vazhukkumpara etc. This type of forests are seen in the following sites

### **2.6.1.7 Tropical Sub-montane Hill Valley Swamp Forests**

This forest type occurs in narrow strip of water-logged area continuously wet for a fairly long time during rains and found mostly in depressions. The important habitat factor is the prolonged summer flood. Between the floods the soil dries out to varying extent and where it is heavy and retentive the available water may be scanty resulting in poor plant growth. Soil is rich in humus and continuously wet or at least moist. This forest is open and consists of evergreen trees of high ecological efficiency and is able to withstand the high moisture content of the soil. The trees are of medium height ranging from 10 to 25m. This type is of restricted occurrence in the sanctuary.

### **2.6.1.8 Riparian Forests**

According to Chandrasekharan (1962a, b & c) riparian forest is an edaphic formation on riverbanks dependent upon a constant supply of moisture and is a conspicuous association, met with along river banks in certain localities where *Vateria indica* is the predominant species. Riparian forests are found along water course where moisture regime is very favourable for growth. This forest type is seen along the Panamparathodu, Kaviyar, Karamanayar, Kuttiyar, Ottakalluthodu, Panniyamkaduthodu, etc. below 600m. They are generally more productive in terms of biomass and they provide special microclimatic environment for a wide variety of biota. The riparian type has a dendric pattern that maximizes edge contact with other habitats. It also offers better cover, food and migration route for wildlife species. Besides these, it also serve as barrier for forest fire and have an important role in the conservation and functioning of river / stream ecosystems. However, these forests are degraded and becoming extinct due to various anthropological activities.

The upper storey consists of *Vateria indica*, *Calophyllum apetalum*, *Hopea parviflora*, *Lophopetatum wightianum*, *Artocarpus hirsutus*, *Gluta travancorica*, *Lagerstroemia microcarpa*, *Mangifera indica*, and *Gymnacranthera farguhariana*. The lower storey comprises of *Madhuca neriifolia*, *Vitex altissima*, *Aporusa lindleyana*, *Hydnocarpus alpina*, *Hydnocarpus macrocarpa*, *Olea dioica*, *Syzygium cuminii*, *Ixora arborea* and *Xanthophyllum arnottianum*. The ground cover consists of *Impatiens umbellata*, *Impatiens verticillata*, *Memecylon angustifolium*, *Memecylon terminale*, *Torenia courtallensis* and *Pouzolzia wightii*. The common climbers are *Entada rheedei*, *Butea parviflora*, *Dioscorea wallichii* and *Calamus thwaitesii*. In

certain areas large formations of bamboos and reeds are seen (*Ochlandra ebracteata* & *Ochlandra wightii*).

#### **2.6.1.9 Southern Sub-tropical Hill Forests**

The sub tropical vegetation exhibits a transitional zone between tropical and temperate vegetation. This forest type is more or less ecotonic or transitional in nature. The floristic elements consist of a mixture of those found in the tropical forests and those of the montane temperate forests- the former element usually predominating. The vegetation is not very luxuriant. The trees are shorter and with less shapely boles and festooned with herbaceous and cryptogamic epiphytes. The low stature of trees is mainly due to elevation, the high velocity of wind, and less favourable soil conditions. This type of forest is mainly confined to the eastern region as a narrow belt where the interstate boundary coincides with the Kalakkad-Mundanthurai Tiger Reserve. Major portion of the subtropical region occur at Chemmunjimottai.

The characteristic trees in the **upper storey** are *Cullenia exarillata*, *Elaeocarpus munronii*, *E. tuberculata*, *Mesua nagasarium* and *Vateria indica*. The **middle storey** comprise of the younger generation of the first storey. The **lower storey** consists of *Nilgirianthus warrensis*, *Canthium neilgherrense*, *Hedyotis albo-nervia*, *Nilgirianthus foliosus*, *Nilgirianthus heyneanus*, *Scutellaria violacea* and *Pogostemon purpurascens*. The common climbers are *Jasminum cordifolium* and *Piper trioicum*.

#### **2.6.2 Wildlife**

Faunal diversity is considered to be a strong indicator of health of any ecosystem. An area of 53sq.km of sanctuary lying continuous with the Neyyar wildlife sanctuary in the Southeast, Agasthyavanam biological park in the West and the Kalakkad-Mundanthurai Tiger Reserve on the east offers ideal habitat for the long term survival of several species of wildlife. The reservoir formed by the Peppara Dam is the major source of water for the animals and habitat for several water birds.

43 species of mammals, 233 species of birds, 46 species of reptiles, 13 species of amphibians and 27 species of fishes, ( ) Butterflies, are identified from the sanctuary. Major mammals include Elephant, Gaur, Sambar deer, Lion Tailed Macaque, Nilgiri

Langur, Nilgiri Marten, Slender Loris, Sloth Bear, Leopard Cat etc. The occasional presence of Tiger and Leopard adds to the faunistic wealth of the sanctuary.

Of the 233 species of Birds, important sightings include Painted bush quail, Black rumped flameback, Three toed kingfisher, Red winged crested cuckoo, Forest eagle owl, Grey headed fishing owl, Tiger bittern, Nilgiri wood pigeon, Black & orange flycatcher, Kerala laughing thrush etc.

Among the 13 species of Amphibians are Common Indian toad, Indian bull frog, Jerdon's bull frog, Indian tree frog, Malabar tree frog etc. Among the fishes are species such as Filament barb, Tilapia, Silver fish, Cat fish, Eel etc.

### **2.6.3 Identification of Habitats and Habitat use by Wild Animals**

Elephants and Gaur have an overbearing presence in the sanctuary. Peppara wildlife sanctuary harbouring a great deal of floral diversity is home to several species of wildlife too. Chemmunjimotta, the region in the core zone of the sanctuary, is like a plateau about 1300m above mean sea level and runs along the crest of the mountains and crosses over to the Inter State border, sharing its boundary with the Kalakkad-Mundanthurai Tiger Reserve of Tamilnadu. This region comprises of extensive grasslands interspersed with patches of shola. This region supports strong population of Elephants and Gaur. Presence of Tiger and Leopard have also been observed in this area. The Athirumala region of the sanctuary is a very important habitat for the Lion Tailed Macaque. There is a need for strict control of activities like trekking, tourism etc in this kind of habitat for preserving the ecological integrity of the area.

# CHAPTER 3

## HISTORY OF MANAGEMENT & PRESENT PRACTICES

### 3.1 HISTORY OF SANCTUARY ESTABLISHMENT & MANAGEMENT

After the construction of the dam at Peppara, the catchment area of the reservoir was declared as a Wildlife Sanctuary in 1983 mainly for the protection of the catchment, and also for the purpose of conserving and developing the wildlife of the region and its habitat. In order to attain these objectives, Peppara was declared as a wildlife sanctuary by the Government of Kerala Notification no: 379/83/AD dated 21.12.1983. The tract dealt with comprises of Palode and Kottoor Reserved Forests. The area was previously part of Paruthipally Range of Thiruvananthapuram Forest Division up to 1985. Peppara was initially a Range under the Shendurney Wildlife Division, however in 1998 Peppara was carved out of this division and added on to Thiruvananthapuram Wildlife Division. Presently, Peppara with an extent of 53sq.km is one of the two Wildlife sanctuaries under Thiruvananthapuram Wildlife Division, the other being Neyyar Wildlife Sanctuary. As regarding the socio- economic influences, human habitations, cattle grazing and permanent cultivation by tribal population living in tribal settlements causes much damages. Rehabilitation programmes of these people outside the sanctuary limits have been not found successful till now.

### 3.2 REVIEW OF PAST MANAGEMENT PLANS

The first management plan for Peppara Wildlife Sanctuary was from the period 1990-91 to 1999-2000. The boundaries of the sanctuary were demarcated during this plan. However apart from this, the first plan was merely just a document of its own without any specific objectives to achieve. The plan didn't lay much emphasis on the specific requirements of the sanctuary. The zonation of the sanctuary into administrative zone, tourism zone, buffer zone and core zone based on the significance and landscape features was not at all specified and carried out. Though the plan aimed at a well defined staff deployment for administering the sanctuary, it wasn't implemented during this plan period. Moreover the plan looked upon only very limited areas of protection like poaching, fire etc while other areas of conservational importance such

as soil, water, vegetation, NWFP collection etc were not dealt seriously. The limited infrastructural facilities, equipments, materials, vehicles, lack of wildlife training to staff and together with shortage of staff hindered the effective protection and daily administration of the sanctuary. The plan didn't indicate the people-PA mutual impact and as such no eco development initiatives were carried out during the plan. The facilities and requirements of visitor management, monitoring of sanctuary components etc though were clearly indicated in the plan, were not implemented due to several factors. Further, no institutional arrangements were made to undertake research in the sanctuary and as such the data prepared lacked scientific input and authenticity in areas related to flora, fauna, climate, hydrology, socio economics of the tribals etc.

The second Management Plan was from the period 2002-03 to 2011-2012. The main objectives of the plan were, Conserving the biodiversity of the sanctuary, To maintain the vegetation and landscape from further degradation and fragmentation, Restoration of the degraded areas, Regulating excessive human interaction in the area, Creating public awareness, Conserve the watershed of the sanctuary, Promoting research and nature based tourism, Promotion of ecodevelopment programmes etc. During this plan period, many of the objectives were fulfilled to a great extent though not all the objectives were fulfilled successfully. The major achievements of the plan are:

- The zonation of the Sanctuary into Core, Buffer and Tourism zones were achieved and the uncontrolled tourism activities were restricted to a large extent
- The protection activities have been strengthened through regular patrolling and perambulation of sensitive areas using the available staff and protection watchers
- In order to reduce the human-wildlife conflict near the settlements, solar fencing, trenches and jungle stone walls were erected in few areas
- Participatory fire management was strengthened incorporating maximum members from EDC in fire protection activities. Reduction in the number of fire incidents is a direct success indicator of this programme
- Nature Camps were organized regularly for imparting awareness especially for school and college students

- Ecodevelopment committees were formed as envisaged in the plan and addressed the social and economic issues of people in and around PA
- New initiatives to EDC's, mainly income generating programmes were carried out thereby improving their socio economic profile and equipping the local tribal people and fringe dwellers for effective and better participation in the management of the sanctuary
- For effective and quick communication facilities, all the field staff were provided with a post paid sim card having CUG(Common user group) facilities

### **3.3 TIMBER OPERATIONS INCLUDING BAMBOO & FIREWOOD HARVEST**

#### **3.3.1 Timber Operations/Firewood collection**

There are no timber operations in the sanctuary. However collection of firewood occurs in varying degree across the region and is a major problem within the sanctuary. The practice is widespread due to the existence of tribal settlements within the sanctuary and the existence of bonaccord tea estate in the fringe area. The people of tribal settlements and locals are regularly engaged in illegal collection of Non timber forest products which are mainly used for sale outside the sanctuary and for domestic consumption too. The unscientific collection practices of Non timber forest products causes severe damage to the ecosystem. A rough assessment of main NWFP products collected is shown below.

**TABLE 7: ASSESSMENT OF NWFP COLLECTION IN A YEAR**

Sl.no	Items	Place of collection	Qty (Kg)	Areas
1	Honey, Pepper, Tamarind	Podiyakkala	200kg 100kg 100kg	Peppara ,Podiyakkala,
2	Kasthoori manjal	Kaduvappara	300kg	Podiyakkala, Chemmankala
3	Ponnampoovu	Maruvappara	200kg	Podiyakkala, Chemmankala

The status and growing stock of NWFP in Peppara sanctuary is appended as Appendix I.

### **3.4 FOREST PROTECTION**

#### **3.4.1 Illegal Removal, Poaching, Encroachments**

When compared with Neyyar sanctuary, illegal activities are very less in Peppara. However such practices can still be rarely observed in areas near tribal settlements and forest fringes. Incidents of poaching have been reported from the sanctuary in the past. Poaching cases of gaur, elephant, sambar deer, wild boar, etc have been reported from the sanctuary in the past. The most sensitive area of the sanctuary is the Chemmunjimottai region which is widely exposed to poaching and smuggling of NWFP's. Since the areas are too remote, it is difficult to carry out frequent patrolling. Poaching and smuggling gangs from Tamilnadu are entering the sanctuary through entry points in the Tamilnadu region and operating in areas like Pandipath, bonaccord areas of the core zone. Small scale illegal activities are also seen along the tribal settlements and forest fringes. As such frequency of patrolling is now increased with the establishment of permanent monitoring blocks and border patrolling. Along with the existing 5 Anti Poaching Camp Sheds (Athirumala, Karalakodu, Pandipath, Kanithadam and Bonaccord) one check post is proposed to be constructed at Karalakodu and one more Anti Poaching Camp Shed at either Karamanayar or Vazhapainthiyar with additional staff strength. There is also a need to persuade the people living in the estates and forest fringes to surrender the weapons with the help of EDC's.

**TABLE 8: DETAILS OF FOREST OFFENCES DURING 2002-2011**

<b>Year</b>	<b>KF Act</b>	<b>WLP Act</b>	<b>Total</b>
<b>2002</b>	1	1	<b>2</b>
<b>2003</b>	2	1	<b>3</b>
<b>2004</b>	1	1	<b>2</b>
<b>2005</b>	6	2	<b>8</b>
<b>2006</b>	4	1	<b>5</b>
<b>2007</b>	6	-	<b>6</b>
<b>2008</b>	10	-	<b>10</b>
<b>2009</b>	5	1	<b>6</b>
<b>2010</b>	2	-	<b>2</b>
<b>2011</b>	-	-	<b>-</b>
<b>2012</b>	1	-	<b>1</b>

<b>Total</b>	<b>38</b>	<b>7</b>	<b>45</b>
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### **3.4.2 GRAZING**

Another issue which needs attention of the park managers is the livestock grazing. People living on the fringe areas keep a large number of cattle and used to set free the animals into the forests for grazing. This not only reduces the fodder supply for wild herbivores but can also lead to the outbreak of diseases like foot & mouth, anthrax etc. Not much studies have been done to assess and quantify the impact of grazing on the ecosystem as a whole. However with the cooperation of Veterinary department vaccination of the local cattle is being done yearly, though not all the cattle are vaccinated. However, by promoting stall feeding and giving alternate income generating activities to these people through EDC's through various other programmes, this problem is under control now. More effective steps in future needs to be initiated to tackle this menace permanently.

### **3.4.3 History of Wild Fires & Fire Management**

The major threat faced by the sanctuary management is forest fire, especially in the dry season. Poachers, smugglers, tribals, local people and pilgrims visiting Agasthyarkoodam are primarily responsible for fire incidents in the Sanctuary. Though monitoring blocks are established for managing fires, it was found ineffective due to inadequate knowledge and skill in reporting, recording and taking necessary preventive measures. Not much importance was given to fire management in the past. However, in recent times the concept of fire management with the involvement of EDC's has gained substantial importance and is showing positive results. Details of available fire incidents from the year 2007 to 2012 are given below.

**TABLE 9:DETAILS OF FIRE INCIDENTS**

<b>Sl.no</b>	<b>Year</b>	<b>Section</b>	<b>Area</b>	<b>Area burnt</b>
1	2007-08	Athirumala	Mukkothivayal, Karalakodu, Muthipara	3ha
		Thodayar	Nil	Nil
2	2008-09	Athirumala	Karamanayar, Ezhumadakantheri,Aamodu	3.5ha
		Thodayar	Nil	Nil
3	2009-10	Athirumala	Panampara	1.5ha

		Thodayar	Nil	Nil
4	2010-11	Athirumala	Nil	Nil
		Thodayar	Nil	Nil
5	2011-12	Athirumala	Nil	Nil
		Thodayar	Nil	Nil

Till now fire tracing and fire watchers were engaged at fire prone areas while fire fighting gangs were engaged to patrol most fire susceptible localities, especially the adjacent areas of tribal settlements and Ezhumadakantheri grassland regions. Fire lines are taken by tracing the boundary lines to the width of 5.2 meters and the center belt is burned after scrapping the two sides to a width of 1.2 meters. This work is taken up by mid December and completed by mid January. Fire mazdoors are engaged to clear the fire traced lines from accumulating debris and as a watch during the fire season.

### **3.5 VISITOR MANAGEMENT, EDUCATION & INTERPRETATION**

#### **PROGRAMMES**

Due to the remoteness of the area, Peppara attracts limited visitors annually except during the visiting season to Agasthyarkoodam. An information cum interpretation centre is functioning at Peppara for providing information to the visitors. Brochures and pamphlets about the sanctuary and its importance are given to the visitors as a part of awareness creation. The accommodation facilities in the sanctuary is very limited at present. An inspection bungalow with 3 rooms owned by the Irrigation department, and a dormitory under Forest department is available for accommodation. The table shown below shows the details of visitors during the past 5 years.

**TABLE 10: DETAILS OF VISITORS DURING  
THE PAST 5 YEARS**

<b>Year</b>	<b>Total Visitors</b>
<b>2007</b>	5490
<b>2008</b>	5668
<b>2009</b>	5043
<b>2010</b>	5660
<b>2011</b>	7055

Nature camps are offered to various target groups especially for educational institutions. Most of the camps are held for school, college, NGO's and the nature clubs which are affiliated to Forest Department. The nature camps are spread over 2-3 days and involves field visit, nature education classes, nature quiz, etc. Camps are conducted by Department officials though resource persons are invited occasionally.

**TABLE 11:DETAILS OF NATURE CAMPS CONDUCTED DURING THE LAST 5 YEARS**

<b>Sl.no</b>	<b>Target Groups</b>	<b>2007- 2008</b>	<b>2008- 2009</b>	<b>2009- 2010</b>	<b>2010- 2011</b>	<b>2011- 2012</b>
1	School/College students	42	33	29	32	27
2	NGO's/Nature clubs	12	8	6	4	2
3	Others	0	0	0	1	0
	<b>TOTAL</b>	<b>54</b>	<b>41</b>	<b>35</b>	<b>37</b>	<b>29</b>

### **3.6 WILDLIFE RESEARCH & MONITORING PROGRAMMES**

Research activities conducted in the Sanctuary are few. Wildlife Census was organized by the Forest Department in 2002 and 2011. The 2011 census was conducted by the Forest Department in association with KFRI and Periyar foundation, the results of which are yet to be received. Elephant population estimation was conducted during 2005,2007 and 2010 and Tiger census was carried out during 2006 and 2010.

### **3.7 ADMINISTRATIVE SET UP, STAFF CAPAILITIES & TRAINING PROGRAMMES**

The sanctuary is under the administrative control of Thiruvananthapuram Wildlife Division with Wildlife Warden as head of the Division. The Assistant Wildlife Warden administrates the day to day work of the sanctuary and the office is located at Peppara. The sanctuary is divided into two sections Thodayar and Athirumalai and the sections are administered by Foresters. Considering the various types of works such as conducting nature camps, issuing entrance tickets to visitors and imparting information and attending for court duty, besides the normal duties of protection and supervision of departmental works, the present strength of protective staff is inadequate.

The department has provided all the field staff with a postpaid sim card with CUG facility.

**TABLE 12:DETAILS OF DEPARTMENT TELEPHONE NUMBERS**

<b>Sl.no</b>	<b>Officials</b>	<b>Number</b>
1	Wildlife Warden's Office	0471-2360762
2	Wildlife Warden (Mobile)	9447979082
3	Assistant Wildlife Warden's Office	0472-2892344
4	Assistant Wildlife Warden (Mobile)	8547602950
5	Section Forester, Thodayar	8547602948
5	Section Forester, Athirumala	8547602945
6	Forester, Range Headquarters	8547602946
7	Forest Guard, Thodayar	8547602947
8	Forest Guard, Thodayar	8547602949
9	Forest Guard, Athirumala	8547602951
10	Forest Guard, Athirumala	8547602952
11	Forest Guard, Athirumala	8547602953

Contact addresses:

Wildlife Warden,  
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**TABLE 13:PRESENT STAFF POSITION IN WILDLIFE WARDEN'S OFFICE**

<b>Sl.no</b>	<b>Staff</b>	<b>Present Strength</b>
1	Wildlife Warden	1
2	Junior Superintendent	1
3	Head Accountant	1
4	U.D.Clerk	3
5	L.D.Clerk	3

6	Typist	1
7	Peon	2
8	Driver	1
9	Part time sweeper	1
10	Attender	1

**TABLE 14:PRESENT STAFF POSITION IN ASSISTANT WILDLIFE WARDEN'S OFFICE**

<b>Sl.no</b>	<b>Staff</b>	<b>Present Strength</b>
1	Asst.Wildlife Warden	1
2	Deputy Ranger	Nil
3	Forester	3
4	Forest Guard	5
5	Wildlife Assistant	0
6	Reserve Watcher	0
7	U.D.Clerk	0
8	L.D.Clerk	1
9	Typist	Nil
10	Driver	0
11	Peon	1
12	Part time sweeper	1
13	Boat Driver	0
14	Watcher cum cook(IB)	0

### **3.7.1 Training**

The present staff has not undergone any form of training in wildlife management, use of advanced field equipments like camera trap, GPS, range finder, night vision equipments etc. The present number of binoculars, GPS, camera trap etc are inadequate and if the same is provided to all field staff, it will be beneficial to maintain regular updating of field data with proper documentation. The lack of trained staff seriously affects the Sanctuary management programmes.

## **3.8 INFRASTRUCTURE**

### **3.8.1 Buildings**

**TABLE 15:DETAILS OF EXISTING BUILDINGS**

Sl.no	Buildings	No.	GPS Readings
1	Assistant Wildlife Warden's Office	1	N 8 <sup>0</sup> 37' 18.0" E 77 <sup>0</sup> 8' 12.3"
2	Information cum interpretation centre	1	N 8 <sup>0</sup> 37' 18.0" E 77 <sup>0</sup> 8' 12.3"
3	Assistant Wildlife Warden's quarters	1	N 8 <sup>0</sup> 37' 18.0" E 77 <sup>0</sup> 8' 12.3"
4	Foresters quarters (duplex)	1	N 8 <sup>0</sup> 37' 18.0" E 77 <sup>0</sup> 8' 12.3"
5	Forest Guard's quarters (duplex)	3	N 8 <sup>0</sup> 37' 18.0" E 77 <sup>0</sup> 8' 12.3"
6	Section Office, Thodayar	1	N 8 <sup>0</sup> 40' 14.6" E 77 <sup>0</sup> 8' 54.3"
7	Section Office, Athirumala	1	N08 <sup>0</sup> 36'57.7" E077 <sup>0</sup> 13'57.1"
8	Anti poaching camp shed, Karalakodu	1	N08*36'25.9" E077*09'41.5"
9	Anti poaching camp shed, Athirumala	1	N08*36'57.7" E077*13'57.1"
10	Dormitory, Athirumala	1	N08*36'57.7" E077*13'57.1"
11	Anti poaching camp shed, Pandipath	1	N08*40'30.4" E077*11'40.0"
12	Anti poaching camp shed, Bonaccord/Picket Station	1	N08*40'11.0" E077*28'83.9"
13	Anti Poaching Camp Shed, Kanithadam	1	N08*40'14.6" E077*08'54.3"
14	IB, Peppara (Unfinished bilding)	1	N08*37'24.4" E077*08'19.7"

**3.8.2 Roads**

The following roads were maintained during the previous plan period.

**TABLE 16: DETAILS OF EXISTING ROADS**

Sl.no	Roads	Section	Distance(Km)	GPS Readings
1	Chemmankala	Thodayar	1	NO8*39'99.8" E077*10'26.1"
2	Podiyakkala	Thodayar	2.5	NO8*39'00.6"

				E077*7'84.2''
3	Peppara- Mukhothyvayal	Athirumala	8	N08*37'09.8'' E077*09'41.1''- N08*36'33.0'' E077*10'03.5''

### 3.8.3 Trek Paths

Apart from roads, several **trek paths** are maintained which are used by the staff for regular perambulation and protection which connects almost all parts of the sanctuary in a network. List of the same is given below.

**TABLE 17: DETAILS OF EXISTING TREK PATHS**

Sl.no	Trek Path	Section	Distance(Km)	GPS Readings
1	Chathancode- Vazhuvanthol	Thodayar	2.5	N08*39'25.4'' E077*09'03.7''- N08*40'22.5'' E077*09'48.2''
2	Chemmankala – Picket station	Thodayar	3.5	N08*39'99.8'' E077*10'26.1''- N08*40'11.0'' E077*08'83.9''
3	Chemmankala- Mannidinjakayam	Thodayar	6	N08*39'41.8'' E077*09'40.9''- N08*39'25.4'' E077*09'52.4''
4	Picket station – Karamana	Thodayar	4	N08*40'11.0'' E077*08'83.9''- N08*39'07.6'' E077*11'28.7''
5	Lathimotta-Bonafalls	Thodayar	2	N08*40'0.2'' E077*10'25.1''- N08*38'76.2'' E077*11'25.2''
6	Bonnacord-pandipath	Thodayar	5	N08*41'23.8'' E077*10'54.6''- N08*40'10.7'' E077*12'09.9''
7	Podiyakkala – Mandapam	Thodayar	4	N08*39'0.6'' E077*7'84.2''- N08*38'36.5'' E077*8'27.1''
8	Peppara – Nadukanippara	Athirumala	3	N08*37'09.3'' E077*08'26.4''- N08*36'9.65'' E077*08'3.09''
9	Karлакodu-Ennakunnu	Athirumala	2	N08*36'29.7'' E077*09'41.1''-

				N08*36'33.0'' E077*10'03.5''
10	Kavyattinmanpuram – Attayar	Athirumala	6	N08*37'41.9'' E077*10'0.1''- N08*38'0.18'' E077*12'6.14''
11	Mukkothyvayal- Attayar	Athirumala	3	N08*36'32.9'' E077*11'16.5''- N08*38'0.11'' E077*12'5.10''
12	Myladumpara – Pothodu	Athirumala	6	N08*35'90.1'' E077*10'9.14'' N08*35'36.3'' E077*11'54.2''
13	Cherumangal- Alikkavu	Athirumala	3	N08*36'0.91'' E077*11'06.9''- N08*35'57.7'' E077*11'21.1''
14	Kunnatheri-Elathodu	Athirumala	3	N08*37'0.49'' E077*10'0.21''- N08*37'25.1'' E077*11'95.2''
15	Pattanippara-Vlavila	Athirumala	2	N08*36'26.0'' E077*11'27.0''- N08*36'27.8'' E077*11'50.0''
16	Muthippara- Erumpiyadu	Athirumala	2	N08*35'87.6'' E077*11'12.6''- N08*35'70.0'' E077*11'12.6''
17	Muthippara- Neduvanthodu	Athirumala	4.5	N08*35'87.8'' E077*11'12.4''- N08*37'24.3'' E077*10'07.5''
18	Pananppara-Paneri	Athirumala	3	N08*36'30.8'' E077*10'57.9''- N08*35'5.02'' E077*09'47.6''
19	Kavyar- Kunnatheri	Athirumala	3	N08*37'80.6'' E077*09'90.7''- N08*37'0.99'' E077*11'6.58''
20	Kudilinga- Pattamppara	Athirumala	3	N08*37'40.5'' E077*11'10.6''- N08*38'7.62'' E077*11'7.02''
21	Pecherippara- Aruvi	Athirumala	4	N08*37'85.1'' E077*11'7.55''- N08*38'7.62'' E077*11'2.55''

22	Attayar –Athirumala	Athirumala	4	N08*37'42.9'' E077*10'02.4''- N08*36'50.4'' E077*12'01.6''
23	Karamanayar – Attayar	Athirumala	4	N08*39'06.5'' E077*11'28.7''- N08*37'42.9' E077*10'02.4''
24	Kavyar -Anakkal	Athirumala	7	N08*37'80.6'' E077*09'96.7''- N08*37'42.9' E077*10'02.4''

### **3.9 LEASES&CONCESSIONS IN THE SANCTUARY&THEIR MANAGEMENT**

There are no leases and concessions in the Sanctuary.

### **3.10 SUMMARY OF THREATS TO PA**

The common management problems presently encountered by the PA are the following.

- **Fire**
- **Exotic and Invasive weeds**
- **Poaching & Fishing in the reservoir**
- **Illegal felling of trees & small timber, collection of firewood**
- **Pressure of tourism & illegal entry of tourists**
- **Human Wildlife Conflict**
- **Grazing**

However despite these odd factors, the Sanctuary still harbors a great diversity of flora and fauna. In addition to its inherent ecological value, the PA is valued for its role in maintaining the water supply to Thiruvananthapuram city and sub-urban areas and meeting the livelihood needs of the local people. This creates significant challenges to the PA managers for managing the impacts of these diverse interests according to expectations of various stakeholders.

**(i) Fire:** Fire is one of the serious problems faced by the sanctuary especially during the dry season. Poachers, smugglers, tribals and local people are mainly responsible for fire in the sanctuary. Fire in these habitats would lead to destruction of these fragile habitats and may lead to the extinction of several species of plants, animals, insects and microorganisms. In order 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 PA .

**TABLE 18:DETAILS OF EXISTING FIRE LINES**

<b>Sl.no</b>	<b>Fire Lines</b>	<b>Section</b>	<b>Distance (Km)</b>	<b>GPS Readings</b>
1	Bonaccord Picket Station- Karamanayar	Thodayar	8	N 8 <sup>0</sup> 40' 11.0" E 77 <sup>0</sup> 8' 83.9" N 8 <sup>0</sup> 39' 0.65" E 77 <sup>0</sup> 11' 28.7"
2	Chemmarkala- Bonaccord Picket Station	Thodayar	5	N 8 <sup>0</sup> 39' 99.8" E 77 <sup>0</sup> 10' 6.1" N 8 <sup>0</sup> 40' 11.0" E 77 <sup>0</sup> 8' 83.9"
3	Chemmarkala- Bonna falls	Thodayar	5	N 8 <sup>0</sup> 39' 99.8" E 77 <sup>0</sup> 10' 6.1" N 8 <sup>0</sup> 38' 7.62" E 77 <sup>0</sup> 11' 2.55"
4	Old Check Post- Bonnacord	Thodayar	10	N 8 <sup>0</sup> 40' 7.8" E 77 <sup>0</sup> 8' 38.6" N 8 <sup>0</sup> 40' 42.2" E 77 <sup>0</sup> 9' 33.6"
5	Nellikapara-Podiyakala	Thodayar	5	N 8 <sup>0</sup> 38' 183" E 77 <sup>0</sup> 8' 299" N 8 <sup>0</sup> 39' 006" E 77 <sup>0</sup> 7' 842"
6	Chithancode- Vazvanthole	Thodayar	5	N 8 <sup>0</sup> 39' 99.8" E 77 <sup>0</sup> 10' 26.1" N 8 <sup>0</sup> 39' 840" E 77 <sup>0</sup> 9' 726"
7	Peppara-Podiyam	Athirumala	8	N 8 <sup>0</sup> 37' 9.3" E 77 <sup>0</sup> 8' 26.4" N 8 <sup>0</sup> 36' 5.22" E 77 <sup>0</sup> 10' 3.68"
8	Podiyam- Mukkothivayal	Athirumala	4	N 8 <sup>0</sup> 36' 5.22" E 77 <sup>0</sup> 10' 3.68" N 8 <sup>0</sup> 36' 32.9"

				E 77 <sup>0</sup> 11' 16.5''
9	Mukkothivayal- Perechipara	Athirumala	5	N 8 <sup>0</sup> 36' 32.9'' E 77 <sup>0</sup> 11' 16.5''- N 8 <sup>0</sup> 37' 85.1'' E 77 <sup>0</sup> 11' 7.55''
10	Perechipara-Aruvi	Athirumala	5	N 8 <sup>0</sup> 37' 85.1'' E 77 <sup>0</sup> 11' 7.55''- N 8 <sup>0</sup> 38' 7.62'' E 77 <sup>0</sup> 11' 2.55''
11	Mailaadumpara-Pothodu	Athirumala	6	N 8 <sup>0</sup> 35' 90.1'' E 77 <sup>0</sup> 10' 9.14''- N 8 <sup>0</sup> 35' 36.3'' E 77 <sup>0</sup> 11' 54.2''
12	Karamanayar-Attayar	Athirumala	8	N 8 <sup>0</sup> 39' 6.5'' E 77 <sup>0</sup> 10' 9.14''- N 8 <sup>0</sup> 37' 42.9'' E 77 <sup>0</sup> 10' 2.4''
13	Thalathilkaadu- Nachiyar	Athirumala	5	N 8 <sup>0</sup> 35' 60.7'' E 77 <sup>0</sup> 12' 0.36''- N 8 <sup>0</sup> 36' 50.4'' E 77 <sup>0</sup> 12' 1.6''
14	Olathodu-Koovani	Athirumala	5	N 8 <sup>0</sup> 37' 90.1'' E 77 <sup>0</sup> 11' 27.5''- N 8 <sup>0</sup> 36' 50.7'' E 77 <sup>0</sup> 18' 6.4''
15	Kudulinga-Kunnatheri	Athirumala	2	N 8 <sup>0</sup> 37' 809'' E 77 <sup>0</sup> 11' 211''- N 8 <sup>0</sup> 37' 099'' E 77 <sup>0</sup> 11' 658''
16	Karamanayar-Attayar	Athirumala	8	N 8 <sup>0</sup> 39' 66.5'' E 77 <sup>0</sup> 11' 28.7''- N 8 <sup>0</sup> 37' 479'' E 77 <sup>0</sup> 10' 2.4''
17	Attayar- Ezhumadakkantheri	Athirumala	7	N 8 <sup>0</sup> 37' 42.9'' E 77 <sup>0</sup> 10' 024''- N 8 <sup>0</sup> 36' 504'' E 77 <sup>0</sup> 12' 1.6''

**(ii) Exotic & invasive weeds:** Exotic weeds such as *Lantana camara*, *Eupatorium odoratissima*, *Mikania micrantha* are found infested in several parts of the sanctuary. These weeds are known for their vigorous and rampant growth and once established spreads at an alarming rate. It damages the natural species by depriving them of sunlight, water, nutrients, damages seedlings and their regeneration and releases certain substances that inhibit the growth of other plants. Weed eradication is attempted in many areas but the results are not found to be satisfactory and effective. It can be reduced or eradicated through creating shade which is not suitable for these weed species. It is important to control or destroy in very beginning before dispersal of seeds. It is suggested that it would be better to uproot or destroy when it is seen in small area. Uprooting before flowering and burning would be the best option to control from wider spreading. Weed eradication has been done in the following areas where its growth was intensive and damaging. These areas are to be treated annually till it returns to its original status.

**(iii) Poaching & fishing in the reservoir:** Incidents of poaching have been reported from the sanctuary in the past. Poaching cases of gaur, elephant, sambar deer, wild boar, etc have been reported from the sanctuary in the past. The most sensitive area of the sanctuary is the Chemmunjimottai region which is widely exposed to poaching and smuggling of NWFP's. Since the areas are too remote, it is difficult to carry out frequent patrolling. It is reliably learnt poaching and smuggling gangs from Tamilnadu are entering the sanctuary through illegal entry points on the Tamilnadu region and operating especially in areas like Pandipathu, bonaccord areas of the core zone. Though poaching has been reduced to certain extent, the chances of it still happening cannot be ruled out completely. Fishing, especially in the interior part of the reservoir is done by tribals. Frequency of patrolling and overnight camping in vulnerable areas have to be done on a much regular basis. Along with strict enforcement of law, awareness may be created among the local communities to effectively tackle issues such as illegal fishing and their selling, if any, in outside market. Map showing the probable areas of fishing is attached in the list of maps.

**(iv) Illegal felling of trees & small timber, collection of firewood:** Cases of illicit felling of trees and small timber are reported now and then, however a steady decrease in these incidents are seen over the years. Regular patrolling and perambulation are

being done to check these illegal activities. Collection of firewood and other NTFP's occur in various degrees across the sanctuary.

**(v) Pilgrimage to Agasthyarkoodam:** There is a high influx of tourists into the sanctuary during the Agasthyarkoodam season which starts from January 14(Makaravilaku) and ends in February on the day of Sivarathri. The people visiting here causes serious damage to the ecosystem. Presently 100 people/day are permitted to visit in order to reduce the negative impact on the ecosystem. Illegal entries of people are also observed from certain places wherein checking stations are activated to curb illegal entries. More effective border patrolling shall resolve this issue. A trekking package is also being operated collecting 4000Rs/5 persons for trekking to Agasthyamala and Pandipath assisted by EDC guides. The number of visitors going under this package is considerably less.

**(vi) Grazing:** The existence of cattle in and around the PA 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 and human habitation. Vaccination programme against such disease is conducted with the cooperation of the veterinary department.

**(vii) Human-wildlife conflict:** Attack by wild animals have increased considerably during the previous plan period. Incidents of attack by elephants, bear and gaur are also reported. Animals like elephants, wild boar destroys the crops of the tribals, leading to conflicts .A mini unit of anti depredation squad is functioning with head quarters at Peppara from 10/2011 due to agitation by tribal people when a tribal woman was killed by wild elephant at Muthipara on 20/08/2011

**TABLE 19: DETAILS OF ANIMAL ATTACKS**

Sl. No	Place where attacked	Death/Injury	Male/female	Year
1	Nil	Nil	Nil	2007
2	Nil	Nil	Nil	2008
3	Lathimotta	2/0	Male	2009
4	Nil	Nil	Nil	2010
5	Muthipara	1/2	2/1	2011

**TABLE 20: DETAILS OF COMPENSATION**

Sl. No	Year	Relief to Victim(Rs)	Crop Damage(Rs)
1	2007-08	Nil	Nil
2	2008-09	2,00,000	8600
3	2009-10	Nil	Nil

4	2010-11	Nil	Nil
5	2011-12	3,00,000	Nil
	<b>TOTAL</b>	<b>5,00,000</b>	<b>8600</b>

# CHAPTER 4

## PEOPLE-PA INTERFACE SITUATION

### 4.1 VILLAGES/SETTLEMENTS INSIDE & ON THE FRINGE OF THE PA & THEIR SOCIO-ECONOMIC & PA DEPENDENCY PROFILE

A detailed socio economic survey of the tribals inside the sanctuary has been conducted. (See overleaf). There are 13 tribal settlements inside the sanctuary namely:

- Chemmankala
- Podiyakala
- Podium
- Kamalakam
- Kombidi
- Cherumangal
- Aamoodu
- Vlavila
- Mukkothivayal
- Kunnatheri
- Pattampara
- Pothodu
- Erumbiyadu.

### 4.2 PEOPLE-PA MUTUAL IMPACT ASSESSMENT

A total of 5 EDC's namely Cherumangal, Podiyam, Podiyakkala, Bonacord and Chathancodu functions in the sanctuary and is working together with Forest Department in the overall protection of the sanctuary. The major role of the EDC's comes during the fire season while forming the PFM committees. Fire protection activities including tracing of fire lines are being done through the committees formed from EDC's. Daily wage protection mazdoors are also selected from EDC members and are engaged in the Protection activities at various locations inside the Sanctuary. Majority of the people residing in the settlements inside and on the fringes of PA are depending the forests highly for their livelihood. The activities of the people in the settlements is a hindrance to the wildlife of the sanctuary. Pilgrimage to Agasthyarkoodam is one of the major problems faced by the Forest Department in

Protected Area management. Every year during the pilgrimage season large number of people are visiting this place for offering religious customary practices. The numbers of pilgrim people are increasing every year without having any control. Since the area is within the sanctuary people have to travel deep inside forest to reach the holy place. People are leaving lot of spoilage including containers, plastic bottles, carry bags, etc. along the roads during the travel. This is causing severe damage to the biodiversity and rich wildlife of the sanctuary. There is an urgent need to strictly monitor this and impose regulations for the pilgrims and fine for those violating the rules.

#### **4.3 EVALUATION OF PAST & CURRENT DEVELOPMENTAL PROGRAMMES FOR PEOPLE'S WELFARE**

The Ecodevelopment activities taken up by Forest Department have created commendable impact on the people. Providing basic amenities, energy alternatives, drinking water facilities and giving assistance for income generation are some of the activities taken up. These Ecodevelopment activities had helped in creating awareness among the inhabitants and there by strengthened the relation between the people and PA managers. In continuation with the past activities initiated by Forest Department, few more were carried out during the present plan.

**TABLE 21:DETAILS OF SOLAR FENCING, TRENCHES, STONE WALLS ETC**

<b>Sl.no</b>	<b>Location</b>	<b>Solar fencing</b>	<b>Trenches</b>	<b>Stone walls</b>
1	Chemmarkala	1.8km	1.4km	Nil
2	Podiyakkala	3.150 km	4km	Nil

**TABLE 22: DETAILS OF DEVELOPMENTAL ACTIVITIES DONE UTILIZING NAP, ECODEVELOPMENT & STATE/CENTRAL FUNDS DURING THE PREVIOUS PLAN PERIOD**

<b>Sl.no</b>	<b>Name of EDC</b>	<b>Activities Done</b>	<b>Year</b>
1	Cherumangal	a)Purchased and distributed 2000 no.s of Rubber stumps to EDC members. b)Purchase of umbrella, bag etc to	2006  2011

		students as part of educational assistance	
2	Podiyam	a)Purchased agricultural implements like spade, Kunthali etc to members, b)Purchased Rubber Roller to Kombidi settelement	2008-09  2008-09
3	Podiyakkala	a)Started a stitching unit b)MFP collection unit c)Constructed a culvert at Podiyakala	2004  2004  2008
4	Chathencode	a)Stitching training centre b)Candle manufacturing unit, c)Unit for lending plates, chairs etc d)Chathancode causway	2003  2005  2006  2007

#### **4.4 PAST ECO DEVELOPEMNT INITIATIVES & THEIR IMPACT**

The Ecodevelopment programmes are functioning comparatively in a proper manner in the sanctuary. The major field of involvement of the EDC's as far as Peppara Wildlife Sanctuary is concerned is in (i)**Fire Protection** (ii) **Ecotourism Activities** (iii) **General Protection of the Sanctuary**.

(i) **Fire Protection**: The major role of the EDC's comes during the fire season while forming the PFM committees. Fire protection activities including tracing of fire lines are being done through the committees formed from EDC's. This has also helped them in earning an income for their livelihood. However, merely by being a member

in the EDC and fire fighting gangs doesn't fulfill the mutual commitment of EDC members & Forest Department. More efforts like monitoring of fire lines & constant vigil against forest fires and protection activities are expected from the EDC's. For this to be achieved, further awareness programmes and trainings need to be imparted to the functional EDC's.

(ii) **Ecotourism Activities:** Trekking to Agastyarkoodam, visit to Vazhvanthol waterfalls are the two major eco tourism activities being assisted by EDC's. Labour to the tune of about 3500 man days are provided to the tribal people every year by operating these tourism packages. Now, the income generated from the tourism activities is not sufficient enough to meet their expenses. More infrastructural facilities are needed for the ecotourism activities. One battery operated boat can be tried to carry out boating in reservoir in a pilot basis. An Ecotourism plan has to be prepared by the Wildlife Warden to regulate these activities effectively without damaging the environment.

(iii) **General Protection of the Sanctuary:** With the co-operation of the local communities, protection issues in the Sanctuary were reduced to a large extent. However, more active and committed involvement from the local people and EDC members needs to be there.

**TABLE 23:DETAILS OF NAP TREATMENT AREAS RAISED BY EDC's**

Sl.No	EDC	Year	Place	Species	Treatment Area
1	<b>Cherumangal</b>	2006-07	Pekallikkavu	Bamboo	25ha
2	Cherumangal	2006-07	Kunnatheri	Cane	10ha
3	Cherumangal	2006-07	Vlavila	Perennial herbs & shrubs	15ha
4	Cherumangal	2008-09	Manjirampara	Bamboo	15ha
5	Cherumangal	2008-09	Kunnatheri	ANR	10ha
6	Cherumangal	2009-10	Pattanippara	ANR	13.25ha
1	<b>Podiyam</b>	2006-07	Paneri	Bamboo	25ha
2	Podiyam	2006-07	Karalakkode	Perennia l herbs & shrubs	10ha

3	Podiyam	2008-09	Karalakkode	ANR	25ha
4	Podiyam	2008-09	Udayanpara	ANR	20ha
<b>1</b>	<b>Podiyakkala</b>	2006-07	Murukkupara	Bamboo	26ha
2	Podiyakkala	2006-07	Palamoodu	ANR	46ha
3	Podiyakkala	2007-08	Nelikkappara	ANR	15ha
4	Podiyakkala	2007-08	Nelikkappara	Bamboo	15ha
5	Podiyakkala	2008-09	Nelikkappara	ANR	10ha
<b>1</b>	<b>Bonnacord</b>	2006-07	Kaduvappara	Perennia l herbs & shrubs	5ha
2	Bonnacord	2006-07	Bonafalls	MFP	22.50ha
3	Bonnacord	2006-07	Cheriyamanjadi- kanam	Cane	10ha
4	Bonnacord	2007-08	Cheriyamanjadi- kanam	Cane	9ha
5	Bonnacord	2007-08	Chambalappu	Cane	10ha
6	Bonnacord	2009-10	Mamoottuvalavu	Bamboo	10ha
<b>1</b>	<b>Chathancode</b>	2006-07	Maruthummoodu	Bamboo	25ha
2	Chathancode	2006-07	Ottakkallukarikka kom	ANR	25ha
3	Chathancode	2006-07	Nakkalippara	Bamboo	13ha

#### **4.5 IMPLEMENTATION OF FOREST RIGHTS ACT**

**TABLE 24:DETAILS OF SETTLEMENT UNDER FOREST RIGHTS ACT**

<b>Sl.No</b>	<b>Settlement</b>	<b>Total No.of Claims</b>	<b>No.of families for which settlement rights are issued</b>	<b>No.of families where survey work is completed</b>	<b>Pending in district level committee</b>
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1	Podiyakala	69	47	69	22
2	Podiyam	29	Nil	Nil	Nil
3	Kombidi	22	Nil	Nil	Nil
4	Kamalakom	38	Nil	Nil	Nil
5	Kunnatheri	10	Nil	Nil	Nil
6	Pattampara	Nil	Nil	Nil	Nil
7	Vlavila	Nil	Nil	Nil	Nil
8	Cherumangal	Nil	Nil	Nil	Nil
9	Erumbiyad	Nil	Nil	Nil	Nil
10	Mukkothivayal	Nil	Nil	Nil	Nil
11	Pothode	3	Nil	Nil	Nil
12	Chemmankala	16	Nil	16	Nil
13	Amode	23	Nil	Nil	Nil

Source: ITDP office Nedumangad

**TABLE 25: DETAILS OF DIVERSION OF FOREST LAND UNDER RECOGNITION OF  
FOREST RIGHTS ACT,2006**

SL.No	Year	Area of forest land diverted	No.of trees felled	Purpose of Diversion	Remarks
1	2010	-	7	Bus service from Sundarimukku-Podiyakkala	No.B-1022/2010dtd 11/8/2010 of WLW Tvpmp
2	2011	0.03ha	Nil	Electrification of Chatencode-Chemmankala tribal settlement	No.B-1846/2011dtd 9/12/2011 of WLW Tvpmp
3	2011	0.175ha	Nil	Electrification of Podiyakkala tribal settlement	No.B-1847/2011 dtd 9/12/2011 of WLW Tvpmp.

# CHAPTER 5

## VISION, OBJECTIVES, ISSUES & PROBLEMS

### 5.1 THE VISION

In the Stakeholders workshop on preparation of Management Plan for Peppara Wildlife Sanctuary held on 9/6/2011, the vision statement was drafted. It reads as follows: *“To reduce the people dependency on the sanctuary, thereby conserving the biological diversity of Peppara wildlife sanctuary for future generations”*

### 5.2 OBJECTIVES OF MANAGEMENT

- To protect and conserve the rich biodiversity of the sanctuary and to develop the region as an ideal habitat for the long term survival of several species
- To manage the grasslands and other degraded forests
- To protect the catchments of Peppara reservoir
- To strengthen People-PA interface through revamping the EDC’s and to reduce the people dependency on the sanctuary
- To promote environment conservation awareness and regulate nature based tourism

### 5.3 PROBLEMS IN ACHIEVING OBJECTIVES

The problems identified in achieving each of the above objectives and the broad strategies suggested in the stakeholders’ workshop are as follows:

**TABLE 26:PROCEEDINGS OF STAKEHOLDER’S WORKSHOP**

<b>Sl.no</b>	<b>Constraints</b>	<b>Strategies</b>
<b>1)To protect and conserve the rich biodiversity of the sanctuary and to develop the region as an ideal habitat for the long term survival of several species</b>		
	1) Inadequate information on rare, endangered, threatened and endemic species	<ul style="list-style-type: none"> <li>▪ Review the available literature and compile information, including population estimation of Key species</li> <li>▪ Identify the gaps in information and collect required data through studies, surveys within a stipulated period</li> <li>▪ Preparing and updating of vegetation map</li> <li>▪ Develop and implement</li> </ul>

		<p>habitat improvement activities</p> <ul style="list-style-type: none"> <li>▪ Review the species requirements including waterholes, myristica swamps etc</li> </ul>
	2) Lack of wildlife health monitoring	<ul style="list-style-type: none"> <li>▪ Conduct periodic survey and assessment of animal populations</li> <li>▪ Conduct regular wildlife health monitoring</li> <li>▪ Impart training to field staff, EDC members for conducting wildlife health monitoring</li> </ul>
	3) Lack of mechanism for coordination with scientific institution	<ul style="list-style-type: none"> <li>▪ Develop institutional mechanism(KFRI, TBGRI, CESS,SACON, CWRD,WII, NGO's etc)</li> </ul>
	4) Lack of monitoring mechanism of special habitats and unique species	<ul style="list-style-type: none"> <li>▪ Develop and implement monitoring protocol.</li> <li>▪ Impart training to the staff for implementing monitoring protocol</li> <li>▪ Procure infrastructure(Binocular, digital camera, GPS, compass, range finder, night vision equipments etc)</li> <li>▪ Ensure posting of staff with aptitude</li> <li>▪ Create a database at division level, evaluate annually and generate reports</li> </ul>
	5) Exotic and invasive weeds (Mikania, Pueraria phaseoloides (kalapayar))	<ul style="list-style-type: none"> <li>▪ Identify and prioritize weed infested area,</li> <li>▪ timely removal through appropriate method (uprootal, cutting, based on participatory site specific plan)</li> <li>▪ Monitor eradicated area</li> </ul>
	6) Fire	<ul style="list-style-type: none"> <li>▪ Prepare and implement fire protection plan</li> <li>▪ Implement participatory fire management</li> <li>▪ Monitor impact of fire</li> </ul>
	7) Illegal guns in the settlement & fringe areas	<ul style="list-style-type: none"> <li>▪ Enforce legal provisions with the support of line department</li> <li>▪ Persuade the owners to surrender the weapons with the support of EDC's</li> </ul>

	8) Encroachment	<ul style="list-style-type: none"> <li>▪ Demarcate the settlement boundary</li> <li>▪ Settle the rights of local tribal community</li> </ul>
	9) Illegal felling and poaching	<ul style="list-style-type: none"> <li>▪ Prepare and implement the protection plan</li> <li>▪ Provide infrastructure support</li> <li>▪ Camp sheds: Existing facilities need to be improved</li> <li>▪ Proposed camp sheds: Karamanayar or Vzhapainthiyar. One new check post at Karalacode</li> <li>▪ Vehicles: Existing Jeep 1, bike 1</li> <li>▪ Proposed Jeep 2 bike 1</li> <li>▪ Arms: Revolver 1, Rifle 5 Proposed: same</li> <li>▪ Supply of camping gear</li> <li>▪ Roads: Maintain all existing roads.</li> <li>▪ Maintain all trek paths</li> <li>▪ Staff strength. Need additional staff(list attached)</li> </ul>
	10) Firewood collection	<ul style="list-style-type: none"> <li>▪ Evaluate the quantity and impact of fuel wood collection(short term study and monitor through EDC)</li> <li>▪ Explore possibilities of providing LPG connection, biogas, fuel efficient choolahs etc</li> </ul>
	11) Non settlement of Rights	<ul style="list-style-type: none"> <li>▪ Facilitate settlement of rights of tribes</li> </ul>
	12) Grazing(from outside PA and from settlements within)	<ul style="list-style-type: none"> <li>▪ Evaluate the impact</li> <li>▪ Address through EDC inputs</li> </ul>
	13) Use of insecticides/pesticides in the cultivated area within the PA	<ul style="list-style-type: none"> <li>▪ Awareness creation</li> <li>▪ Encourage organic farming and marketing through EDC's</li> </ul>
	14) 13 settlements in the PA	<ul style="list-style-type: none"> <li>▪ Facilitate settlement of rights</li> <li>▪ Identify the incompatible activities and address through PFM</li> <li>▪ Active EDC's shall be reconstituted by modifying the micro plans and non functional EDC's shall be dismissed</li> </ul>
	15) Accumulation of non degradable pollutants	<ul style="list-style-type: none"> <li>▪ Awareness creation</li> <li>▪ Enforcement of legal</li> </ul>

		provisions
	16) Inadequate staff strength	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	17) Fishing	<ul style="list-style-type: none"> <li>▪ Enforcement of legal provisions</li> <li>▪ Training to local EDC's for sustainable fishing for self consumption</li> </ul>
		▪
<b>2) To Manage the Grasslands and other Degraded Forests</b>		
	1) Habitat management to suit the grazers	<ul style="list-style-type: none"> <li>▪ Controlled burning</li> <li>▪ Identify the areas and practice on a rotation basis</li> </ul>
	2) Fire	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	3) Grazing	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	4) Firewood collection	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	5) Weed invasion	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	6) Illicit felling	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	7) Inadequate knowledge on factors affecting the grasslands and degraded forest ecosystem	<ul style="list-style-type: none"> <li>▪ Conduct studies</li> <li>▪ Planting of indigenous and fruit bearing trees/bamboo in degraded areas</li> </ul>
	8) Lack of regeneration	<ul style="list-style-type: none"> <li>▪ Conduct studies</li> <li>▪ Initiate appropriate soil and moisture conservation works</li> </ul>
	9) Lack of monitoring of the system	<ul style="list-style-type: none"> <li>▪ Monitoring the restoration progress</li> <li>▪ Develop participatory monitoring system with EDC's</li> <li>▪ Impart training to staff/EDC's</li> </ul>
<b>3) To Protect the Catchment of Peppara Reservoir</b>		
	1) Soil erosion;	<ul style="list-style-type: none"> <li>▪ Identity and prioritize the problematic areas</li> <li>▪ Plant the areas with reed/bamboo, soil bunds, gully plugging etc</li> <li>▪ Soil moisture conservation measures</li> </ul>
	2) Sand mining	<ul style="list-style-type: none"> <li>▪ Strengthen EDC involvement wherever incidences are reported</li> <li>▪ Initiate legal actions</li> </ul>
	3) Accumulation of non degradable pollutants	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	4) Illicit felling	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	5) Lack of regeneration	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	6) Incompatible landuse in private land adjoining PA	<ul style="list-style-type: none"> <li>▪ Awareness creation</li> </ul>
<b>4) To Strengthen People-PA interface</b>		

	1) 13 settlements in the PA	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	2) Non settlement of rights	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	3) Man wildlife conflict (wild boar, elephant, monkeys, Gaur)  Crops that are most affected:- Tapioca, pineapple, cocconut, pepper, arecanut, plantain. Affected domestic animals -goat, poultry, rabbit	<ul style="list-style-type: none"> <li>▪ Erect barriers/trenches/solar power fencing, stone falls, bio fencing (planting agave, caesalpinia, koduveli etc)</li> <li>▪ Maintenance of existing barriers involving EDC's</li> <li>▪ Awareness creation for crop pattern</li> <li>▪ Study the crop pattern, intensity of damage, animals involved etc and evolve strategies for mitigation of problems</li> <li>▪ Timely payment of compensation</li> </ul>
	4) Inadequate linkages with line departments	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	5) Sanitary facilities-inadequate	<ul style="list-style-type: none"> <li>▪ Address through FDA</li> </ul>
	6) Lack of drinking water facilities	<ul style="list-style-type: none"> <li>▪ Address through FDA</li> </ul>
	7) Delay in payment of compensation	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>
	8) Lack of alternate livelihood options	<ul style="list-style-type: none"> <li>▪ Address through EDC's</li> </ul>
<b>5) To Promote Environment Conservation awareness and linkages with government agencies to develop nature based tourism</b>		
	1) Lack of awareness programmes	<ul style="list-style-type: none"> <li>▪ Develop appropriate programmes for different target groups</li> </ul>
	2) Lack of awareness materials/information brochures	<ul style="list-style-type: none"> <li>▪ Develop materials/brochures/Stickers for information dissemination with professional inputs</li> <li>▪ Create and maintain a website for the sanctuary</li> </ul>
	3) Lack of ecotourism programmes and linkages with DTPC	<ul style="list-style-type: none"> <li>▪ Address the issue through FDA and develop linkages with DTPC</li> </ul>
	4) No visitor management institutions	<ul style="list-style-type: none"> <li>▪ Impart training by KITTS, KTDC etc</li> </ul>
	5) Inadequate staff strength	<ul style="list-style-type: none"> <li>▪ Already covered</li> </ul>

## CHAPTER 6

# **THE STRATEGIES AND FUTURE MANAGEMENT**

## **Boundaries, Zonation, Zone plan and Theme Plan**

The Management Plan proposes for division of the Sanctuary into various zones and prescribes the strategies for each zone under zone plans. Details of activities would be provided under the theme plans.

### **6.1 BOUNDARIES**

The Wildlife Warden shall ensure and monitor the boundaries of the Sanctuary bordering human habitation is clearly demarcated and no encroachments are there.

### **6.2 ZONATION**

- Provide a geographical framework to facilitate the management of the Sanctuary
- Indicate which management directions have priority in various part of the Sanctuary
- Assess in minimizing existing and potential conflicts between uses and activities or between these to the protection of the Sanctuary values
- Formulate a developmental proposal assessing the basis for suitable activities

### **6.3 ZONE PLANS**

The Sanctuary is divided into the following Zones namely

- Protection Zone
- Core Zone
- Buffer Zone
- Tourism Zone

The whole Sanctuary is brought under the **Protection Zone**. The **Core Zone** is located on the eastern part of the sanctuary and starts from Chathancode to the valleys lying between the reservoir and the state border. The core zone has forests on all four sides with the buffer zone on the western portion. The extent of the core zone is around 30sq.km which is about 60% of the total area and comprises of areas such as Chemmunjimottai, Pandipath Koviltherimalai, Athirumalai, Nachiyarmottai, Kannan kunnu, Kadirumudimalai etc. The Core zone is the region where human interference is strictly prohibited. No tourism activities, trekking, interior camping etc shall be allowed in this zone except the ongoing tourism packages. The **Buffer Zone** is

located on the western portion of the sanctuary and occupies an area of around 23sq.km which is about 40% of the total area of the sanctuary. 5.82sq.km of this zone is the water spread area of Peppara Reservoir. All the 13 tribal settlements are located in this zone. The **Tourism Zone** overlaps with the buffer zone which need to be strictly rationalized and sorted out.

### **6.3.1 Plan for Protection Zone**

#### **6.3.1.1 Measures to curb illicit activities**

The Sanctuary is supported with anti poaching camp sheds at places like Karalakodu, Athirumala, Pandipath, Bonnacord and Kanithadam. Protection watchers shall halt permanently in the camp sheds. Improvement of these structures and their periodic maintenance should be carried out regularly. Bathrooms and toilets need to be constructed where there are none. Trenches shall be taken around all the camp sheds and shall be urgently provided with facilities like solar lamps, torches, leech proof socks, sleeping bags, coats, GPS, etc. In addition to this, one checkpoint need to be constructed at Karalacode and one new anti poaching camp shed at either Karamanayar or Vazhapainthiyar. Steps shall be taken to persuade owners to surrender weapons especially in the Bonnocord estate regions and enforce legal provisions in cases of willful violations. The Assistant Wildlife Warden should prepare monthly camping schedules for the staff so that the staff also camp in the anti poaching camp sheds in a rotation basis. Considering the various types of works such as attending nature camps, issuing entrance tickets to visitors and giving information, looking after livestock and attending for court duty, besides the normal duties of protection and supervision of departmental works, the present strength of protective staff is inadequate.

**TABLE 27: PROPOSED STAFF POSITION OF WILDLIFE WARDEN'S OFFICE**

<b>Sl.no</b>	<b>Staff</b>	<b>Present Strength</b>	<b>Proposed Strength</b>
1	Wildlife Warden	1	1
2	Junior Superintendent	1	1
3	Head Accountant	1	1
4	U.D.Clerk	3	<b>4</b>
5	L.D.Clerk	3	3
6	Typist	1	1

7	Peon	2	2
8	Driver	1	1
9	Part time sweeper	1	1
10	Attender	1	0

**TABLE 28: PROPOSED STAFF POSITION OF ASSISTANT WILDLIFE WARDEN'S OFFICE**

<b>Sl.no</b>	<b>Staff</b>	<b>Present Strength</b>	<b>Proposed Strength</b>
1	Asst.Wildlife Warden	1	1
2	Deputy Ranger	Nil	<b>1</b>
3	Forester	3	3
4	Forest Guard	5	<b>8</b>
5	Wildlife Assistant	0	<b>1</b>
6	Reserve Watcher	0	<b>3</b>
7	U.D.Clerk	0	0
8	L.D.Clerk	1	1
9	Typist	Nil	Nil
10	Driver	0	<b>1</b>
11	Peon	1	1
12	Part time sweeper	1	1
13	Boat Driver	0	<b>1</b>
14	Watcher cum cook(IB)	0	<b>0</b>

**6.3.1.2 Communication & protection measures**

- Periodic maintenance of all existing buildings (list 3.8.1). A proposal must be prepared for the completion of the unfinished buildings in the plan period itself. The dormitory at Athirumala must be strengthened by providing roof top covering and essential repair works
- Procurement and maintenance of vehicles, boat and field equipments
- The Assistant Wildlife Warden should ensure that all department staff are using department supplied mobile sim cards. He should ensure all the official sim cards are returned back to the office once an official is transferred.

- Improvement and maintenance of all existing roads, trek paths, bridges, culverts, fence etc shall be done to improve the accessibility (list 3.8.2).

### 6.3.1.3 **Fire protection measures**

- All existing firelines (List 3.10d) shall be maintained annually to control fire incidents in the sanctuary. Fire prone areas tackled under NAP also must be fire protected
- Participatory fire management involving the local stakeholders' and awareness creation
- Engaging daily wages mazdoors for fire protection
- Early controlled burning of grasslands need to be carried out

### 6.3.1.4 **Habitat Improvement**

- Controlled burning of grasslands. It is identified 4 sites in the sanctuary are having grasslands. The present plan proposes for control burning of around 50ha each year. Each of the 4 sites may be sub divided into several blocks and select one of this blocks from each of the 4 sites every year on a rotation basis. The size of the blocks depends on the extent of the area. Details of Grasslands are shown below.

**TABLE 29: DETAILS OF GRASSLANDS**

Sl. No	Name	Section	Area	Gps reading
1	Pandipath	Thodayar	Around 20ha	N08*40'30.4" E077*11'40.0"
2	Njarakunnu	Athirumala	Around 50ha	N08*38'37.8" E077*11'49.6"
3	Attayar	Athirumala	Around 200ha	N08*38'0.15" E077*12'6.10"
4	Mukothyvayal	Athirumala	Around 100ha	N08*36'32.9" E077*11'16.5"

- Eradication of invasive and exotic weeds. The areas where weed eradication was carried out is listed below. The problems in these areas should be tackled every year till it regains its original status. Details of weed infested areas are shown below.

**TABLE 30:DETAILS OF WEED INFESTED AREAS**

Sl.no	Location	GPS reading	Remarks
1	Peppara site	N08*37'09.4"	Myceenia

		E077*08'26.3"	,Eupatorium
2	Quarry	N08*37'08.3" E077*8'4.09"	Myceenia ,Eupatorium
3	Peyumuttilppara	N08*36'54.6" E077*08'53.7"	Myceenia ,Eupatorium
4	Anakulam	N08*36'47.5" E077*09'00.9"	Myceenia ,Eupatorium
5	Neduvanthodu	N08*37'20.3" E077*10'06.5"	Myceenia ,Eupatorium

- Desilting and maintenance of water holes and check dams (list 2.5.2).New check dams are proposed at Valiyamachadikanam of Thodayar section and one at Athirumala section
- Catchment area protection by appropriate soil and moisture conservation works
- Conservation measures like fire protection,species identification etc for myristica swamps. Details of myristica swamps are shown below

**TABLE 31: DETAILS OF MYRISTICA SWAMPS**

SL.No	Location	Section	GPS Readings
1	Plamoodu	Athirumala	N08*36'19.8" E077*10'03.5"
2	Alikkavu	Athirumala	N08*35'32.6" E077*11'21.0"
3	Kallarappar	Athirumala	N08*36'34.8" E077*11'07.7"
4	Pananpara	Athirumala	N08*36'30.8' E077*10'57.9"
5	Dravyamotta	Athirumala	N08*38'43.9" E077*11'43.3"
6	Perechiappu	Athirumala	N08*36'92.4" E077*10'40.4"

### **6.3.1.5 Studies/Data Collection**

- Study on the habitat and biology of wildlife and their monitoring
- Mapping of vegetation, Drainage,

- Wildlife monitoring
- Documentation of flora and fauna, impact assessment of invasive weeds
- Conduct periodical surveys and assessment of animal populations.
- Rapid biodiversity assessment

#### **6.3.1.6 Conservation awareness**

- Display of awareness/sign boards especially at potential areas near Peppara dam
- Enforce strict measures to make the sanctuary a plastic free zone and levy fine from rule violators to the extent possible
- Workshops, seminars and public awareness programmes may be conducted
- Development and distribution of brochures, posters, leaflets and pamphlets

#### **6.3.1.7 Wildlife Veterinary Care**

- Vaccination of cattle in the tribal and surrounding hamlets
- Provide support for equipments, medicines and manpower
- Vaccinating the canines
- Veterinary facilities for controlling of disease
- Creation of rescue camps and mobile rescue cages
- Purchase of tranquilizing gun, rehabilitation equipments

#### **6.3.2 Plan For Core Zone**

Areas such as areas such as Chemmunjimottai, Koviltherimalai, Athirumalai, Nachiyarmottai, Kannan kunnu, Kadirumudimalai etc comes under the Core Zone. The Core zone is the region where human interference is strictly prohibited, except approved vide management plan provisions. All the strategies proposed in the protection plan will be strictly practiced in this zone. No further developments other than the prescriptions in the management plan can be implemented in this zone. Avoid tourism activities except for research/management purposes.

#### **6.3.3 Plan for Buffer Zone**

The Buffer Zone is located on the western portion of the sanctuary and occupies an area of around 23sq.km which is about 40% of the total area of the sanctuary. 5.82sq.km of this zone is the water spread area of Peppara Reservoir. All the 13 tribal settlements are located in this zone. The tourism zone overlaps with the buffer zone which need to be strictly rationalized and sorted out. All the strategies proposed in the protection plan will be strictly practiced in this zone. The trekking to Agasthyarkoodam shall be regulated under strict control. The packages of trekking

which are approved in FDA can be operated on the basis of the fee prescribed by the FDA.

#### **6.3.4 Plan for Ecotourism Zone**

The Tourism Zone overlaps with the buffer zone which need to be strictly rationalized and sorted out. An Ecotourism Plan must be developed and implemented by the Wildlife Warden in a phased manner involving the local communities. All the tourism activities, trekking, bird watching trails etc may be limited to this zone.

#### **6.5 THEME PLANS**

Peppara Wildlife Sanctuary shall be managed by the following Theme Plans.

- Protection Plan
- Fire Plan
- Ecotourism Plan
- Water Resource Management Plan

#### **6.4.1 Protection Plan**

Peppara Wildlife Sanctuary is divided into various compartments having required number of anti poaching camp sheds with 1 new camp shed and 1 check post proposed. The Wildlife Warden will prepare and implement the protection plan every year based on the following parameters.

- Division of Sanctuary into patrolling units
- Formation of patrolling team & intelligence gathering
- Surprise checks and raids at sensitive areas
- Staff welfare activities
- Adequate supply of arms and ammunitions.
- Timely maintenance of camp sheds
- Engaging daily wage protection mazdoors
- Associating EDC members in protection activities
- Involving tribal people in participatory forest protection

#### **6.4.2 Fire Plan**

Uncontrolled forest fire is a threat to the forest and cause damage to flora and fauna. Wildlife Warden will prepare and implement fire plan every year considering the following parameters.

- Fire prone areas- (list 3.4.3)
- Participatory fire management activities, tracing fire lines, engaging fire gangs and awareness creation

- Fire fighting tools
- Effective use of satellite transmitted data for fire control

#### **6.4.3 Ecotourism Plan**

- A master plan including all basic facilities needed for the successful functioning of ecotourism shall be prepared by the Wildlife Warden and implemented step by step based on the carrying capacity of the area
- Close monitoring of the Ecotourism activities and assess the impact
- Training to Staff and EDC members on visitor management
- Develop a Website, brochures, sign boards, stickers, pamphlets etc
- Implement measures to make the area plastic free and provide viable alternatives
- Income generation through ecotourism and utilization of the same for the management of sanctuary and welfare of EDC's.

#### **6.4.4 Water resource management plan**

The utilization of habitat by the wild animals depends on the availability of water source within their reach. The Peppara Dam plays a significant role in augmenting water supply to the fauna of the sanctuary. The following activities are proposed for the effective water resource management of the Sanctuary

- Updating the drainage map
- Installation of meteorological station
- Annual maintenance of check dams, water holes, etc (list 2.5.2)
- Construction of mini check dams at strategic areas including one checkdam at Valiyamanchadikanam at Thodayar section
- Protection of the catchment area by appropriate soil and moisture conservation measures

#### **6.4.5 Eco Restoration Plan**

- Identifying more degraded forest patches
- Initiating soil and moisture conservation works at degraded patches at.....
- Planting appropriate indigenous/fruit bearing trees/ bamboo etc
- Monitoring the restoration progress and evaluation

#### **6.4.6 Eco Development Plan**

- Active EDC's must be revamped and dormant ones to be dismissed

- Promote use of renewable energy sources in tribal settlements and fringe area population of the sanctuary
- Review the present status of various activities done for income generation and based on the report, revamp the promising ones and close down the dormant projects
- All trenches and kayyalas shall be maintained periodically to reduce man animal conflict
- A committee shall be formed for selecting members from EDC's for the periodical maintenance of solar fencing , kayyala etc

## **CHAPTER 7**

# **ECO TOURISM, INTERPRETATION & CONSERVATION EDUCATION**

## **7.1 AN OVERVIEW**

Wilderness based recreation has an important value and has an important role in support of management. It can directly benefit the cause of conservation, bring about economic benefit to local communities and open the way for conservation education of local people and visitors. However, uncontrolled and unmanaged tourism strangles PA management. It can tie down wildlife managers almost full time in its activities at the cost of his primary responsibilities of forest protection. The main goal is to strengthen the cause of conservation in general and of the management of the PA in particular through (i) Providing informed wilderness experience to visitors (ii) Enabling the visitor to view a cross section of PA values. The following facilities related to environment conservation awareness and nature based tourism are available in the Sanctuary. (i) Information cum Interpretation Centre (ii) Dormitory (iii) IB of Irrigation Department

## **7.2 THE VISION & STRATEGIES OF THE PLAN**

### **7.2.1 VISION**

*“To promote environment conservation awareness and regulate nature based tourism”*

### **7.2.2 STRATEGIES**

#### **7.2.2.1 Environment Conservation Awareness**

- Create a team of trained manpower for organizing conservation education, ecotourism and eco development activities
- Conduct nature awareness camp for various target groups, preference need to be given to local schools and communities (list 3.5)
- Conduct public awareness programmes on nature conservation
- Develop education materials focusing wildlife for various target groups- leaflets, brochures, pamphlets, posters, stickers etc
- Procure equipments such as computer, laptop, digital camera, audio visual equipments etc for conducting nature camps effectively
- Prepare a professional documentary and website for the Sanctuary
- Develop a herbal garden of medicinal plants with timely maintenance
- Improve the camping facilities in the Dormitory

- Improving facilities at Information cum Interpretation centre

#### **7.2.2.2 Facilitating nature based regulated tourism**

- Capacity building and training to EDC members and staff on human behaviour, visitor management, ecotourism, identification of flora and fauna etc
- Procurement of equipments for ecotourism such as binocular, passenger boat, life jacket, etc
- Design and implement outreach activities
- Create awareness among local communities/visitors on PA
- Legal enforcement with fine to control littering
- Develop basic amenities to the visitors such as pure drinking water toilets etc.

Wildlife Warden will conduct annual review of environmental conservation programmes and nature based regulated tourism activities. The tourism activities needs to be strictly controlled and should be continued in future for the conservation and protection of vulnerable and fragile species and their habitat. Trekking and camping inside interior forests must be discouraged. Trekking and bird watching trails shall be conducted in the ecotourism zone only. EDC's will be assisting the ecotourism activities which shall be under the full control and supervision of Forest Department.. Ecodevelopment surcharge shall be levied from visitors and must be recycled for sanctuary management as well as ecotourism programmes. The increase in the number of visitors over the years clearly indicates the potential behind regulated tourism which has to be tapped wisely.

**TABLE 32: DETAILS OF INCOME THROUGH ECOTOURISM ACTIVITIES**

<b>Sl.No</b>	<b>Year</b>	<b>Amount (Rs)</b>	<b>Ongoing approved ecotourism packages</b>
1	2007-08	82550	1) Visit to Bonafalls- Rs 35/person
2	2008-09	88100	2) Visit to Pandipath Rs 4000/5 persons
3	2009-10	176980	3) Visit to Agasthyarkoodam Rs 350/person
4	2010-11	209985	4) Visit to Agasthyarkoodam (off season)
5	2011-12	428875	Rs 4000/5 persons

## **CHAPTER 8**

## **ECO DEVELOPMENT**

### **8.1 AN OVERVIEW**

Ecodevelopment is seen as a site specific conservation friendly package of measures for environmentally compatible development. The primary objective of eco-development programmes is for reducing the dependency of forest and forest side dwelling communities on forest based natural resources. Social and economic acceptability are integral to such a package that leads to conservation of biological diversity. The protected area is strategically zoned and correspondingly managed. To make the strategies work, the managers need to be clearly aware of the socio-economical, cultural and lifestyle related profiles of the forest side communities. It is essential to improve the current practices and also develop ecologically sustainable and economically viable packages of alternatives that are acceptable to people; i.e. those packages which are self-sustaining and in harmony with the surrounding forests and PA. To succeed, eco-development must enlist the willing participation of the people concerned, and mutual trust between Forest department and people is a vital element in this process.

### **8.2 THE VISION & STRATEGIES OF THE PLAN**

#### **8.2.1 VISION**

*“Strengthening People-PA interface through revamping the EDC’s and to reduce the people dependency on the Sanctuary”*

#### **8.2.2 ISSUES**

- (i) Man animal conflict
- (ii) Fire
- (iii) Revamping the EDC’s
- (iv) Lack of alternative livelihood options
- (v) Firewood collection & pollution

#### **8.2.3 STRATEGIES**

##### **8.2.3.1 Man animal conflict**

- Timely assessment of wildlife damage and payment of compensation
- Persuade people to surrender weapons
- Institution of crop insurance

- Prompt maintenance of electric power fencing to prevent wildlife entering the farmlands
- Designing appropriate eco development programmes
- Sourcing funds from various source, local bodies/other line department/Government of India through FDA
- Development of adequate trained support team including social workers, voluntary service
- Planting of Agave ammericana and similar species on the boundaries to act as a bio fence to reduce man animal conflict

#### **8.2.3.2 Fire**

- Impart awareness programme to EDC members and school children
- Involve Forest dependant community in the Participatory Fire Management
- Seek assistance/fund from the Local Self Government for Fire prevention activity and control measures through NREGS
- Procure Fire fighting equipments and impart training to the EDC members

#### **8.2.3.3 Revamping the EDC's**

- Take steps to improve the functioning of active EDC's and to dismiss the inactive ones
- Impart training to staff and dependant communities

#### **8.2.3.4 Lack of alternate livelihood options**

- Explore possibilities of developing quality products utilizing the facility at NWFP processing centre at Kottoor
- Impart training to EDC members
- Linkage with similar organizations

#### **8.2.3.5 Firewood collection and pollution**

- Provide LPG gas, biogas, fuel efficient choolahs etc to the poor forest dependant community
- Propose Fuel Wood Plantation in private and public area
- Study the extent and impact of firewood collection
- Display awareness boards
- Supply biodegradable carry bags to settlement and fringe area population to the extent possible and introduce the same in Agasthyarkoodam trekking season
- Establish waste bins in the pollution prone areas

- Develop recycling method of plastics and other non degradable material by installing machines at a central point

### **8.3 ECO DEVELOPMENT INITIATIVES**

- Alternate livelihood practice
- Scholarship to the forest dependent community childrens’
- Developing drinking water facility
- Setting up of self help group
- Conducting medical camps
- An NWFP value addition centre

The Ecodevelopment committees may meet together at least once in a month and evaluate their activities. The Assistant Wildlife Warden can attend such meeting. The Wildlife Warden can ensure the monthly meeting of the EDC’s in random. Detailed schedule of meetings can be finalized in FDA general body meeting.

## **CHAPTER 9**

# **RESEARCH, MONITORING & TRAINING**

## **9.1 AN OVERVIEW**

Research and Monitoring are among the weakest areas in wildlife management. Research need not necessarily be only biological or ecological but those of sociology and economics are equally important. However, the progress achieved in this area is not satisfactory. Research has suffered due to lack of policy, clarity of objectives, priorities and inadequate funding. It needs to be something that can directly contribute towards improvement of management and for this to be achieved research need to be initiated and rigorously conducted. Knowledge and techniques that can be used to enhance the quality of management and provide appropriate response to management issues are necessary. Training to the staff is yet another critical aspect in maintaining management capability. Training needs must relate to PA management objectives, and should be developed as a theme plan addressing visualized function at all levels as per activities projected in the plan.

## **9.2 THE VISION & STRATEGIES OF THE PLAN**

*“Undertaking long term research for gathering scientific inputs for the better management of the sanctuary components and to equip staff with scientific knowledge for professional management of the sanctuary”*

## **9.3 STRATEGIES**

### **9.3.1 Research**

- Study on the habitat and biology of endangered species in the sanctuary
- Documenting the flora and fauna of the PA
- Periodical surveys and assessment of animal populations
- Vegetation mapping of the Sanctuary
- Drainage mapping including mapping of check dams, water holes etc
- Studies on invasive species
- Study the extent of wildlife damage caused and the crop involved
- Study the extent and impact of firewood collection
- Evolve scientific/sustainable collection method for NWFP management
- Socio economic status survey of tribals inside PA

### **9.3.2 Monitoring**

- Monitoring of wildlife, their reproduction and habitat.
- Regular wildlife health monitoring
- Monitoring the follow up activities conducted by the nature camp students
- Monitoring ecotourism impact and initiating necessary steps for resolving the same

### **9.3.3 Training**

- Impart training to staff and EDC members on wildlife health monitoring, camera trap etc
- Impart training to staff on GPS, computer application etc
- Impart training to EDC members and staff for sustainable collection of NWFP and value addition
- Training to staff in weapon handling and maintenance
- Capacity building for staff in intelligence gathering, identifying wildlife article, acts & rules etc
- Capacity building and training to guides and staff on visitor management.
- Training to Staff and EDC members on record maintenance and accounts of EDC
- Capacity building of local communities for ecotourism programmes

## **CHAPTER 10**

# **ORGANIZATION & ADMINISTRATION**

## **10.1 AN OVERVIEW**

Organizational pattern, responsibilities of officials at various levels and their functions etc is a key component in PA management. Often wildlife staff is posted in inhospitable areas but rarely the minimum support needed to sustain such postings is planned or if planned it is not available. The amenities provided to the staff such as housing, special pay, field equipment, communication, incentives and awards is very much important in the day to day administration of the PA. This should be done in accordance with the existing situation and needs of the PA.

## **10.2 THE VISION & STRATEGIES OF THE PLAN**

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

The present organizational structure of the Sanctuary

**Chief Conservator of Forests-1**

Agasthyavanam Biological Park

(Thiruvananthapuram)



**Wildlife Warden-1**

(Thiruvananthapuram)



**Assistant Wildlife Warden-1**

(Peppara)



**Foresters-3**

(Thodayar-1, Athirumala-1 Headquarters-1)



**Forest Guards-5**

(Thodayar-2, Athirumala-3)

The Sanctuary will be headed by the Wildlife Warden who has the overall responsibility of implementing the plan. He has to prepare a schedule of operation for the implementation of the plan and provide it to the Assistant Wildlife Warden and Section Foresters. He has to prepare the Annual Plan of Operation and the Schedule

of Operations based on the plan every year in the first week of April. The Wildlife Warden shall not divert from the management plan prescription without the prior permission in writing of the Chief Wildlife Warden. **The Wildlife Warden should ensure that all the control forms prescribed in the Management Plan are properly recorded and maintained.**

The Assistant Wildlife Warden at Peppara with the assistance of protective staff should look after the day to day administration, protection and management of the sanctuary. Special protection camps will be organized at least once a month wherein the staff along with watchers will camp for 3-4days in the interior parts of the forests and patrol the area. Active EDC's shall be reconstituted by modifying the micro plans. The post of a Deputy Ranger need to be sanctioned to co-ordinate, monitor, and control ecotourism activities in the Sanctuary. The plan aims to purchase 1 new jeep and 2 boats for improving the protection activities. One checkpost need to be constructed at Karalacode and one new anti poaching camp shed at either Karamanayar or Vazhapainthiyar. There is a need for additional staff for the effective protection of the sanctuary.