

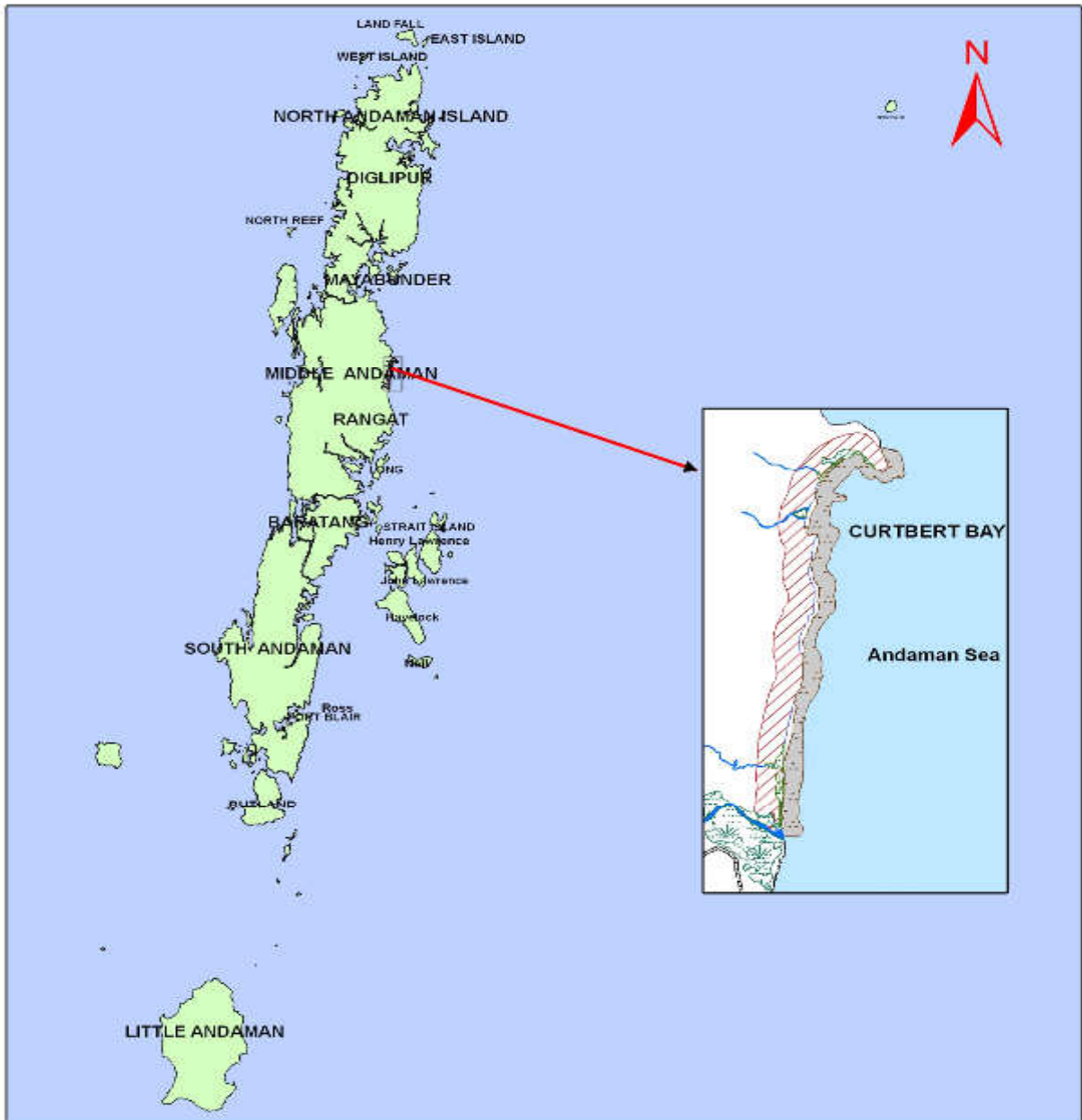
# CHAPTER-1

## INTRODUCTION TO THE AREA

### 1.1 Name, Location, Constitution and the Extent of Area

Andaman and Nicobar Islands are distinct eco-region of our country classified as one of the 12 biogeographically zones of India showing great diversity, variety and high level of endemism in its floral and faunal components. It has a very long coastline of 1962 km, with beautiful sandy beaches. These island ecosystems are very fragile because of their isolation and are extremely vulnerable to biotic pressure. Many of these beaches are visited every year by sea turtles for nesting. The warm sea, coral reefs, sea grass beds and suitable nesting beaches around the island provide ideal habitats for the sea turtles. The Cuthbert bay is one of the famous beach in North Andaman which was found to be visited regularly by the sea turtles in large numbers. Prior to 1997 Cuthbert bay forest which was a part of the Betapur felling series situated adjacent to Betapur village in Middle Andaman was exploited for extracting timber and the Cuthbert Bay beach was used as Ghat depot for storage of the timber logs while in transit. Since Cuthbert Bay is one of the most important areas in A & N Islands visited every year by a large number of turtles for nesting, the Andaman and Nicobar Administration has notified the area as a Wildlife Sanctuary vide Notification No. 62/97/F.No CWLW/WL/3/130 dt 24/04/97 for providing utmost protection and conservation to the sea turtles and other flora and fauna found there (**Appendix-I**). Cuthbert Bay Sanctuary is located in the North Eastern part of Middle Andaman Island between 12°37'23.7" to 12°43'00"N latitude and 92°57'00" to 92°58'30"E longitude. The land area of Cuthbert Bay was notified earlier as Protected Forest vide No.115/47-5/60-DH dated 8<sup>th</sup> September 1963(**Appendix-II**), and it was subsequently declared as Reserved Forest vide Notification No. G/635-3 dt. 15/03/1971(**Appendix-III**). The entire Cuthbert Bay Sanctuary falls inside the south- east part of Cuthbert Bay Forest Block (North and Middle Andaman District). The Cuthbert Bay Sanctuary covers an area of 5.82Sq.Km (approx.) with a stretch of 10.5 km sandy beach at the North eastern coast of the Middle Andaman Islands. The Sanctuary is under the administrative jurisdiction of the Divisional Forest Officer (Wildlife), Mayabunder. The main intention to declare the Cuthbert Bay Sanctuary is to protect the nesting grounds and turtles frequenting the shore for nesting from poachers and predators.

# LOCATION MAP OF CURTBERT BAY WILDLIFE SANCTUARY



**Figure-1 Location of Cuthbert Bay Sanctuary**

## **1.2 Approach and Access**

Cuthbert Bay Sanctuary can be approached by Andaman Trunk Road from Rangat town (22 km), North and Middle Andaman District and Port Blair (250 km) the Capital of A&N Islands (**Figure-1**). The Andaman Trunk Road, connecting South, Middle & North Andaman Main Island passes through Betapur and on the way one has to cross two straits namely Middle Strait and Homphray's Strait through vehicle ferries. Regular buses (public and private) and Taxis operate on this route. Direct Boat service is also available from Port Blair to Rangat. Nearing Betapur one can take a diversion to reach this Sanctuary by using the 715 mts. long walk way or can also reach it through dinghy or speed boat from the Betapur Jetty for easy access/approach to the Cuthbert Bay Sanctuary. The nearest airport is located at Port Blair. Nearest Helipad is at Rangat (16Km) and at Mayabunder (60km). One APWD (Andaman Public Works Department)'s Guest House and one Tourist Hotel (Hawksbill Tourist Lodge) being run by the Department of Information, Publicity and Tourism of Andaman & Nicobar Administration are available for the visitors at Betapur.

## **1.3 The Statement of Significance**

The Cuthbert bay Sanctuary is a large and representative example of tropical, littoral and mangrove forested ecosystem and one of the important nesting grounds for Giant Leather Back turtle, the Olive Ridley turtle and the Green Sea turtle. It is one of the Mass turtle nesting (Arribada) site in India and provides potential for wildlife research and training by relevant institutes. The Sanctuary provides high potential for wildlife recreation, conservation education and awareness and ecotourism opportunities. The Betapur mangrove creek falls within the notional eco sensitive zone (10km) of the PA is one of the best habitats for various endangered species like Salt Water crocodiles. The PA provides cultural and socio-economic security of the villagers and fishermen dwelling in the surrounding areas. The long stretch of coastal forest towards the east side of the PA acts as a barrier for reducing the impact of strong waves like tsunami in the adjacent villages namely Betapur, RRO, Shivapuram, Padmanabhapuram, Dharmapur and Shantipur.

# CHAPTER-2

## BACKGROUND INFORMATION AND ATTRIBUTES

### 2.1 Boundaries

The boundary description of the sanctuary is as follows:-

**North:** The Forest Divisional boundary separating Mayabunder Division from Middle Andaman Division is the northern boundary of the Sanctuary.

**South:** The southern boundary runs parallel to the north bank of the Betapur Nallah up to 600m from the mouth of this nallah meeting the sea.

**West:** The western boundary runs parallel to and 600 m away from high tide line in the Middle Andaman Protected Forest (Proposed Reserved Forest)

**East:** The eastern boundary runs along the coast from high tide mark of east coast starting from the mouth of the Betapur Nallah to Cape Strachan.

Previously the area under the sanctuary was parts of the proposed Middle Andaman Reserved Forests Notified vide G/635-3 dt.15/03/1971 (**Appendix III**). The south, west and north boundary of the Sanctuary is now the boundary of the Middle Andaman Reserved Forest.

The northern boundary of Cuthbert Bay Sanctuary meets the boundary dividing Middle Andaman Division and Mayabunder Forest Division. The entire area of Cuthbert Bay Sanctuary falls inside the territorial jurisdiction of Middle Andaman Forest Division. The ecological boundary is much beyond the notified boundary of the PA. The Betapur nallah falls on the southern boundary of the PA is one of the best habitat for the salt water crocodiles. Even the turtle visits the beaches up to one kilometer beyond the southern boundary of the PA for nesting and considering the zone of wildlife influence a proposal is already submitted to the GOI for notifying the Eco-sensitive area up to one kilometer from the PA boundary in the south, west and north direction.

### 2.2 Geology, rock and soil

Geologically the Andaman Islands form the southward continuation of the Arakan Yoma Range of Myanmar. The two principal rock series encountered in the Andaman are of sedimentary origin and are distinguished as the Port Blair and Ritche's Archipelago series. Some altered igneous intrusion and some volcanic rocks are also associated with them.

Geological formation of North and Middle Andaman is mainly with intrusion of basic and ultra igneous rocks. The eastern side is surrounded by sandy beach and rocky coast. Sandy beach along with some rocky shore occur in the entire length of the shore. The soil is sandy loamy, soft and usually of fine texture. Soil texture is medium on the surface and heavy in the deeper layer. The water holding capacity of the soil is low.

### **2.3 Terrain**

The Cuthbert Bay Sanctuary comprises of gentle slope towards eastern side. In the north and south, the area is flat. However, the terrain within the land area of sanctuary is almost flat. The north-west side of the sanctuary is of undulating terrain. The eastern part of the sanctuary is covered with sandy beach with intermittent sheet rocks.

### **2.4 Climate**

#### **2.4.1 Rainfall pattern**

North and Middle Andaman is situated in the tropical wet zone. Climate is warm and humid for most of the year. The Sanctuary receives both the south- west and the north- east monsoons resulting in almost a continuous wet spell from May to November with a high rainfall during June to September. The weather is clear during the period from January to April and it is the calmest and driest month of the year. The average annual rainfall is about 3000 mm. Meteorological Department, Port Blair is maintaining Data on main climatic parameters like rainfall, temperature, humidity etc.

#### **2.4.2 Temperature**

The Sanctuary, being on the coastal area experiences a very hot climate. The temperature range is narrow and the mean annual temperature varies between 22° C and 28°C. The hottest month being April & May and the coldest month being December & January. The Temperature data of Port Blair has been taken into consideration as that is the nearest place where meteorological data are recorded. **(Annexure-I)**

#### **2.4.3 Humidity**

The relative humidity varies from 75% to 81%.The highest humidity is experienced from May to November during south-west monsoons. The Sanctuary does not experience extremes of climate though the south-west monsoon is particularly harsh as can be seen by the wind blown appearances of the forest particularly on the north-western & western portion of

the island because of strong winds. The climate is mostly wet tropical and warm and generally humid for most parts of the year. There are pronounced dry and rainy season, though extremes of winter and summer are practically unknown.

#### **2.4.4. Wind speeds**

This sanctuary receives strong north east wind between November & December. The wind speed exceeds 25km/hour but the usual range is between 5 to 15km /hour in other months. The south westerly wind between the months of May and October does not affect the sanctuary much as it gets sheltered from the ridges on the western side of Middle Andaman Islands( **Annexure-I**).

In the Bay of Bengal severe cyclonic storms develop during May- June and November- December. These cyclones are formed during the settlement of south- west and north- east monsoon. Cyclones cause heavy shifting of sandy beaches and deposition of debris along the coast. The severe storm also uproots trees and cause heavy damage to forest in the vicinity of the beaches.

The tropical cyclones “Nargis” and “Thane” which initially developed as a tropical disturbance within the monsoon trough of Bay of Bengal & later on developed as a full-fledged tropical cyclone hitting the south western coast of Indian Subcontinent had a varied effect on the Cuthbert Bay Sanctuary leading to uprooting of trees within the sanctuary and flooding of sea water into the low lying parts of the sanctuary.

#### **2.4.5 Drought**

This is not a drought prone area. Water scarcity occurs due to prolonged Period of no rain.

#### **2.4.6 Tsunami**

The word ‘Tsunami’ originates from the Japanese word- “Tsu” meaning harbour and “nami” means waves. The tsunami is caused due to seismic events underwater. An earthquake with its epicenter off the coast of Sumatra measuring 9.3 on the Richter scale caused a severe Tsunami on 26<sup>th</sup> December 2004 which caused heavy damage to this sanctuary. The turtle nests on the beaches were damaged to a greater extent. During the disastrous earthquake followed by tsunami the infrastructures namely the building (Type-II) & Interpretation center was completely damaged. As per the pre-Tsunami record tidal waves varies from 2.5 to 3.02m

with an average of 2.7 m. This generates to a certain extent a vast surface current particularly during spring tide.

## **2.5 Water sources**

This sanctuary does not have any perennial fresh water source. The water is available during rainy season in streams only. The rainfall is spread over 145-195 days of the year. The fresh water supply is completely scarce during summer season. Water supply varies with soil condition and configurations. In this area where under lying rocks are of the serpentine series, the soil has good internal drainage and is covered by a luxuriant growth of ever green forests. A ring well with good fresh water supply has been constructed departmentally in 2012-13 within the sanctuary to augment the fresh water supply.

## **2.6 Range of wildlife, status, distribution and habitat**

### **2.6.1 Vegetation**

#### **2.6.1.1 The Biogeographic classification**

As per the classification by Rodgers and Panwar (1988) the Sanctuary belongs to Biogeographic Zone 9 (i.e. Islands). The Sanctuary belongs to biotic province 9A: Islands – Andamans. The Sanctuary represents mainly the following forests namely (i) Tropical semi-evergreen forests, (ii) Andaman moist deciduous forests, (iii) Littoral forests and (iv) Mangroves.

The Andaman & Nicobar Islands is one of the 221 priority areas concerning global biodiversity. It is not only very rich in both terrestrial and marine biodiversity but also exhibit high degree of endemism which makes biodiversity of these islands very unique. In this particular sanctuary which is quite small in size, a lot of area is covered by sandy beach and as a result there is limited diversity of both plants and animals but the adjacent Reserved Forest, Mangrove creek, and the sea which falls in the notional Eco- sensitive area shows high diversity of flora and fauna.

#### **2.6.1.2 The Forest types, cover and food for wild animals**

The major Zonation of forest types (as per Champion and Seth) that can be seen as one moves towards the western boundary of the sanctuary from the sea shore is:-

- a) Littoral Forests (4A/L1):- *Pongamia pinnata*, *Manikara littoralis*, *Calophyllum ionophyllum* etc.

- b) Mangrove Forests (Tidal Swamp Forests) (4B/TS2):- *Rhizophora* spps, *Bruguiera* spps *Heritiera littoralis*, *Phoenix paludosa*, *Nypa fruticans* etc.
- c) Andaman Semi Evergreen Forests (2A/C1):- *Depterocapus spp*, *Artocarpus chaplasha*, *Tetrameles nudiflora* etc.
- d) Andaman Moist Deciduous Forests (3A/C1):- *Pterocarpus dalbergioides*, *Bombax insignis* etc.

Mangrove Forests (Tidal Swamp Forests) (4B/TS2) species occur in the small patches inside the Sanctuary and in large extent in the periphery and outside the Sanctuary especially in the southern boundary of the Sanctuary. Important tree species occurring in this area are listed in **Annexure II**. The Sanctuary has a very successful coastal plantation of Casuarina planted in 1985 which serves as a green shield and barrier towards strong wind and tidal waves. Area under Casuarina is increasing towards seaward side due to profuse natural regeneration. The Beach provides ideal site for the turtle nesting. The littoral and mangrove Forests are ideal cover for the water monitor lizard, salt water crocodile and many other reptiles and birds. Various fruit bearing trees especially Ficus species attracts a large number of birds.

The types of vegetation found in the Sanctuary are shown in the map given at **Appendix-VI**.

## **2.6.2 Animals**

### **2.6.2.1 Vertebrates, their status, distribution and habitats.**

#### **2.6.2.1.1. Mammals**

The Sanctuary is small in extent and its notional Eco sensitive zone includes Reserved Forests and Sea. Large mammals like Andaman wild pig, Spotted deer, Barking deer, Andaman masked civet, Andaman palm civet, rats and bats have been reported in the sanctuary areas. A list of mammals reported in the Sanctuary is enclosed and marked as **Annexure III**.

#### **2.6.2.1.2 Birds**

The avian faunal species is quite rich and wide varieties of birds are reported here due to the existence of a large number of fruit bearing trees especially Ficus. Examples are Andaman Hill Myna, Small Andaman Drongo, White bellied Sea Eagle, White bellied Swiftlet, Andaman banded Crane, Andaman Dark Serpent Eagle etc. A list of birds reported in the Sanctuary is enclosed and marked as **Annexure III**.

### 2.6.2.1.3 Reptiles

The Reptilian fauna is represented by a variety of sea turtles, monitor lizard, snakes etc.

#### (a) Sea Turtles

Cuthbert bay Sanctuary is one of the important nesting grounds for Giant Leather Back turtle, the Olive Ridley turtle and the Green Sea turtle. The Giant Leather Back turtle nests very occasionally in the Sanctuary. From 2014 onwards mass nesting in case of Olive ridley turtle (known as Arribada) was noticed in these beaches. Marine turtles lead a completely aquatic existence and, excepting the female when egg laying, normally do not come ashore once they reach the sea from the sands under which they hatched. All have paddle –shaped limbs. The longer front limbs are used for swimming. The head and limbs cannot be retracted into the shell. Sea turtles have long been believed to nest on their natal beaches i.e. the beaches where they were born. It is believed that only one in a thousand hatchlings survives till adulthood. Four species are known from Andaman waters. A list of turtle species found in Cuthbert Bay Sanctuary is given in **Annexure-III**.

#### (i) Leatherback turtle (*Dermochelys coriacea*)

Leatherback turtle is the biggest turtle amongst the four turtles which visit Cuthbert Bay beach. The Carapace is elongated about 140-170 cm long, with seven prominent dorsal ridges. Scutes always absent. Mostly black in colour with white spotting; pink or bluish spots on base of neck and flippers. Head is triangular; two maxillary cusps. The Forelimbs are extremely long and plastron is relatively small. The average weight of Leatherback turtles are 500 kg and track is 150 – 200 cm wide, deep and broad, with symmetrical diagonal marks made by forelimbs, usually with a deep median groove from the long tail. They prefer wide beaches with steep slope, rock free deep water approach. Leatherback turtles lay about 80-100 egg and individual egg measures 5 cm in diameter. The leathery turtle is more oceanic than other species of marine turtles. It live mainly on jelly fish and are believed to be deep sea feeders. The Cuthbert Bay in Andaman and Nicobar islands is one of the beaches where the Leatherback turtles occasionally visits for nesting.

#### (ii) Green Sea turtle (*Chelonia mydas*)

The Carapace of Green Sea turtle is broadly oval measuring about 90-120 cm in length, margin scalloped but not serrated. The Costal scutes are four pairs in numbers and

brown with radiating streaks in juveniles. Head shape is anteriorly rounded and has one pair of Prefrontal scales. The limbs are with single claw on each flipper and plastron is white in hatchlings and yellowish in adults. The Green Sea turtle is weighing about 250 kg and track is 100 – 130 cm wide, deep, with symmetrical diagonal marks made by forelimbs. Adults olive green, brown above, with spots or blotches or streaks of brown or black. The hatchling is dark blue-black. It feeds on marine algae and sea grass. Green sea turtle prefer large, open beaches to small cove beaches. The beaches in Andaman islands are one of the preferred beach for nesting. They lay about 100-120 eggs and individual egg measures about 4.5 cm in diameter.

**(iii) Hawksbill turtle (*Eretmochelys imbricate*)**

The Carapace shape of Hawksbill turtle is oval and length is about 80-100 cm. The carapace is strongly serrated with posterior margin with thick overlapping (imbricate) scutes. The Costal scutes are four pairs in number. Colour is brown, boldly marked with amber and brown variegations. The head shape is narrow, straight bird like beak. Hawksbill turtle have two pair prefrontal scales. The limbs having two claws on each flipper and plastron are light yellow to white in colour. The average weight of Hawksbill turtle is about 150 kg and track is 70 - 85 cm wide, shallow, with asymmetrical (alternating) oblique marks made by forelimbs. Hawksbill turtle prefer narrow beaches on islands. Hawksbills also often nest under overhanging vegetation. They lay about 120-150 eggs and individual egg is 3.5 cm in diameter. It is omnivorous, but inclined to be largely carnivorous, feeding on sponges and other invertebrates and on fish as well.

**(iv) Olive ridley turtle (*Lepidochelys olivacea*)**

The Carapace of Olive ridley turtle is short and wide. It is smooth but elevated and measuring about 60-70 cm in length. The Costal scutes are five to nine; asymmetrical. Colour is mid to dark olive green. The head is large, triangular with two pair prefrontal scales. Olive ridley is having two claws on each flipper and plastron having pore near rear margin of infra marginals; creamy yellow. The olive ridley is weighing about 50 kg and track is 70 –80 cm wide, light, with asymmetrical, oblique marks made by forelimbs. They prefer tropical shores and barrier islands, often near river mouths. Andaman and Nicobar is also a preferred site for nesting along with the rest of India. They lay about 100-120 eggs and individual egg measuring about 4 cm in diameter. It is omnivorous. Feeds on crabs, other crustacean, and soft parts of mollusc. It has been observed from 2014 that large number of olive ridley come ashore at Arguna beach in Cuthbert Bay to nest in a period of two-three days.

As mentioned earlier not much research has been carried out in this area apart from the records in respect of turtle nesting since 1995. The data includes date wise and species wise number of turtles that have visited the Cuthbert bay beach, number of nests laid, number of eggs in each nest etc. The details of the last twelve years are given in **Annexure-V**.

**(b) Crocodile**

Estuarine Crocodiles are found in the Betapur nallah where mangroves are luxuriant and the creek forms the southern boundary of the Sanctuary. The animals use the sanctuary area for basking purposes.

**(c) Andaman Water Monitor Lizard**

The Andaman water monitor lizard is fairly abundant in the Sanctuary. They are one of the predators of turtle eggs.

**(d) Snakes**

Both poisonous and non-poisonous snakes are found in the area. However, there are no records available on species of snakes found here. Sea snakes are also seen on beaches and in adjoining vegetation, details is given in **Annexure-III**.

**2.6.2.1.4 Marine Fauna**

The Andaman Sea surrounding the island is a potential fishing avenue to the onshore inhabitants of north & middle Andaman Islands. The sea in the ambience of the islands is very rich & diverse in distribution of marine fauna. Apart from this, rare sea shells i.e. Trochus, Turbo, Clamp shell, King shell, Panja Shell are also found in abundance. Among the fishes giant groupers being rare are one of the major attractions. No studies on the distribution of marine wealth in respect of flora & fauna have been conducted so far.

The noted marine fauna includes the coral snakes, crabs on the creeks, reef fishes, deep water fishes & Shrimps.

**2.6.2.2 Important invertebrates, their status, distribution and habitat.**

Due to variety of habitats found in the Sanctuary the terrestrial Butterflies to corals are found in this sanctuary. Butterflies are as equally attractive as birds here. Some endemic butterflies like Andaman Mormon, Great Mormon, Andaman Club Tail, Great Jay, Tailed Jay, Common Rose, Purple Sapphire etc. can be seen here. The list of butterflies distributed over the Island sanctuary is provided in **Annexure-IV**.

### **2.6.2.3 The Limiting Factors**

The intention to declare the Cuthbert Bay Sanctuary is to protect the nesting grounds and turtles reaching the shore for nesting from hunters and predators. Due to limited size of the Sanctuary terrestrial faunal diversity is very limited. The natural ecosystems of the sanctuary are subject to a few threats which vary widely in the nature and intensity. Details are given below:

#### **a. Forest fire**

Uplifted mangrove patches of forest adjacent to the PA are susceptible for fire hazard. Apart from the forest encroachers who are presently residing inside the PA, the Fishermen and local people used to move in to the sea through the periphery of the PA for fishing and for attending other household works. Regular intensified patrolling is essential during dry season to check and prevent any fire hazard in and around the PA.

#### **b. Illegal hunting**

Wild animals used to enter in to the PA from adjacent Reserve Forests and there is always threat from the poachers who enters in to the PA and involves in hunting of wild animals using traps and other methods. Movement of Fishers and villagers in and around the PA need strict monitoring for avoiding removal of turtle and their eggs. Even there is a need to keep watch and ward over the fishing activities in the sea around the PA for avoiding any damages to the turtles which visits the sea shore for nesting.

#### **c. Encroachments**

Pre and Post 78 encroachers (22Nos.) are still residing inside the PA. They are to be shifted in phase manner for reducing the biotic pressure on the PA.

#### **d. Livestock grazing**

Livestock grazing is a serious threat in the PA due to its proximity to surrounding villages and presence of encroachers inside the PA. Protection teams are to be deployed regularly to prevent the livestock grazing.

#### **e. Movement of dinghy**

The mangrove creek on the southern boundary of the PA is used by the Villagers for fishing as well as for transportation of man and materials. The Creek is a natural home of salt water crocodile. Movement in the Creek is a potential threat as it leads to increasing human-wildlife conflict that adversely affects the management of the sanctuary.

**(f) Tourism**

Tourism services are providing good out turn due to which the local villagers are eager to increase tourism activities in the Beach areas. Proper guidelines are to be framed and the movement of the tourists in the surrounding beaches of Cuthbert Bay Sanctuary are to be regulated for avoiding any disturbances to the turtle during the nesting period. Even there was local resistance to the proposal of declaration of eco-sensitive zone around Cuthbert Bay as well as to the enforcement of restrictions on habitat use by people (i.e livestock grazing, collection of fuel wood and non-timber forest produces). Wild animals dispersing from the Cuthbert Bay Sanctuary like deer, wild pig, crocodiles in quest of additional habitat and forage causes crop and livestock damage and in some cases human killing, which gives rise to man-animals interface conflicts. Illegal trade in wildlife species and its products is a serious limiting factor to a number of wild animal species such as turtles, crocodile, water monitor lizard, swiftlet etc.

# CHAPTER – 3

## HISTORY OF MANAGEMENT AND PRESENT PRACTICES

### 3.1 General

The Cuthbert bay Sanctuary has been carved out of Middle Andaman Reserved Forests and it falls in North and Middle Andaman district, Andaman and Nicobar Islands (UT). The first settlement in these Islands was established in 1857. Until then the aboriginal tribes who used to gather their food from the Forests were present in these Islands. Settlers at first started to clear land for roads, building and for cultivation. In 1870 S.Kurz made a botanical exploration in these Islands and he identified the Andaman Bullet wood ( *Kuppalee*) now called as Khari Mohwa (*Manilkara littorials*) tree as the best timber for various construction use. He published a report and recommended to extract the Sea/Khari Mohwa from the coastal areas. But from 1870 onwards other species like Padauk gained commercial importance and owing to its demand it was exported to mainland market in the form of hand sawn square and scantlings. The Local Administration considered it necessary at this stage to organize the Forest Department. Thus the Andaman Forest department was organized during the year 1883 and it was entrusted with the Management of all the government forests of Andaman and Nicobar Islands. Various explorations were made at different times and suggestions were given for better management of the Forests. Todd explored the North Andaman Forest in 1904 and prepared a working plan in 1906 for these Forests. The object of management was to produce a regular and if possible periodically increasing yield without encroaching on the capital of the forest. Logging operation continued to be selection and irregular, restricted to the more accessible area. In order to extract timber tramlines were constructed at various places from time to time. Skidders and Elephants were also engaged for better outturn. From 1928 Selection method followed by improvement felling was adopted. This system continued till 1938. From 1942 to 1945 Japanese managed these Forests only for their war needs and no attention was paid to either silviculture or management technique. After Independence the Forest Department reorganized its infrastructures to manage the forests of these Islands. From 1952, Chengappa's working plan was followed in general with certain deviations. Andaman shelter wood system was introduced and the blanks created by improvement felling were made good by dibbling of seeds.

As per Working Plan the yield was regulated by area. The felling was to be followed by four years tending operation. Govt. has initiated colonization scheme and clearance of

timber from hilly and flat land allotted to settlers was continued for about a decade 1953-54 and during that period a lot of forest clearance was done in RRO, Betapur and nearby areas adjacent to Cuthbert bay. Under rehabilitation scheme settlers used to reside at RRO and other villages and expanded their agricultural activities. Harvested areas in forest are regenerated both naturally and artificially.

The Middle Andaman Division was headed by Divisional Forest Officer, Middle Andaman headquarter at Long Island. The main function of the Division was extraction of all suitable trees of superior species, in easily accessible locations and to make as much revenue as possible. During the end of the nineteenth century, priorities began to change with the introduction of plantation. The detrimental effects of conversion of large extents of forest areas into plantation and agricultural crops were felt soon and the Administration realized the need to have a holistic view of land management. Necessity to curb indiscriminate damage to forest and to protect them in the sensitive areas was felt. Such concerns came out in the form regulations for forest management. Subsequently during the implementation when inadequacy of these measures was felt, new rules for better management and preservation of forest were introduced. The Forests were managed mainly following the provisions of Indian Forest Act 1927. The Cuthbert bay Forest Block was one of the best extraction site in Middle Andaman Division. The extracted Timber logs were brought and kept for disposal at Cuthbert Bay Ghat Depot. In order to manage the extraction activities the extraction camp was established at Cuthbert bay which was also entrusted to do the management of the Elephants and imparting training for calf elephant.

In the year 1975 research activities were initiated to survey the Turtles visiting the Beaches and protection measures were taken up for its conservation. In order to protect the Forest and Wildlife many acts and rules came into existence like the Wildlife (Protection) Act 1972, Forest Conservation Act 1980, Amendment of Wildlife (Protection) Act in 1991. Slowly extraction was banned by Supreme Court and there after felling was restricted in the worked Forest area as per Working Plan prescriptions. Management of wildlife in and around the Cuthbert bay beaches were done as per the Working Plan prescriptions under the wild life protection working circle for Middle Andaman Forest Division.

Since Cuthbert Bay is one of the most important areas in A & N Islands visited every year by a large number of turtles for nesting, the Andaman and Nicobar Administration has

notified the area as a Wildlife Sanctuary vide Notification No. 62/97/F.No. CWLW/WL/3/130 dated 24/04/1997. This sanctuary is a part of Cuthbert Bay Protected Forests. Timber harvesting took place during 1994, 1996 and 1997 and 50 ha, 62 ha and 61 ha of forest areas had been extracted respectively from this Protected Forests. Natural regeneration operations have been carried out in this area under Andaman canopy Lifting shelter wood system. Consequent to the creation of a separate Wildlife Division at Mayabunder the management of the Sanctuary was came into hands of DCF (WL)-II Mayabunder which was now designated as Divisional Forest Officer (WL) Mayabunder.

Cuthbert Bay beaches were previously kept under Protection working circle as per Working plan of Middle Andaman and in this plan priority was given to the conservation and improvement of wildlife habitat especially for turtle .The beach area and the adjoining forest in the Sanctuary was recommended to be managed exclusively for the Conservation and development of wildlife. The basic management intervention was to intensify protection over the entire area and reduce the biotic pressures. The last Management plan for the Cuthbert Bay sanctuary was prepared by Shri.Shajan Paul, ACF, Wildlife Division, Mayabunder and revised by Dr.Alok Saxena, IFS, CF (Wildlife), for the period 2008-2013. In this management plan, the objectives of management included protecting the undisturbed forest ecosystem and conserving the floral and faunal diversity, providing bench mark data on natural ecosystem, restoring the degraded ecosystem by adopting suitable soil and moisture conservation etc and included the following activities:-

- (i) Protection Plan which included procurement of Fibre boat with OBM engine, engine dinghy, tents and camping equipments, patrolling in land and sea, procurement of equipments.
- (ii) Infrastructure development and capacity Building: - Construction of Camp office, type-II quarter and labour barracks, Training of executive staff.
- (iii) Turtle nesting conservation plan: - Removal of weeds and Garbage disposal from the beach, eradication of casuarinas from the beach on sea ward side, watch and wards for preventing the removal of turtle eggs and hatchlings by stray animals.
- (iv) Nature education, eco-tourism and Eco-development Plan:- Maintenance of nature trail, organizing Nature camps, Training & engagement of youth as guide, Development and

maintenance of facilities for tourists like resting sheds etc, Publication of brochure, booklets, posters etc and development of information centre with local materials.

- (v) Research, Survey and Monitoring: - Procurement of Hardware and Software, Research equipments, survey equipments, Collection of nesting data and monitoring programme with Madras crocodile Trust.

The activities presently continuing in the Sanctuary towards conservation of the Flora and fauna are as follows:-

- (i) Improvement of the nesting sites of Sea turtles as a part of eco-restoration, including removal of Casuarinas at Cuthbert Bay Sanctuary.
- (ii) Survey & Monitoring of Sea turtle nesting at Cuthbert Bay Sanctuary.
- (iii) Studies on Ex-situ conservation including maintenance of hatcheries at Cuthbert Bay Sanctuary.
- (iv) Maintenance of nesting beach areas including regular removal of garbage deposited due to tidal and wave actions at Cuthbert Bay Sanctuary.
- (v) Protection of turtle nesting areas during nesting season by providing round the clock watch and ward in the coastline of the Sanctuary.
- (vi) Conducting nature education and awareness programmes among the school students, P.R.I members & general public to create awareness on turtle conservation and biodiversity of the Island.

To create awareness and to involve the local people into protection & conservation measures they are engaged on daily wages basis for execution of the above mentioned activities. This programme has not only benefited the locals as it acts as a means of employment to them but also to the conservation programme as a whole as the poachers who were previously engaged in the illegal hunting of these reptiles have now become their savior. There are three semi-permanent hatcheries where eggs are transferred after nesting so as to protect them from invasive predators like dogs. Though not much research is carried out in this area but forest department is keeping good records of turtle nesting since 1995.

The data include date wise and species wise number of turtles that have visited the Cuthbert bay beach, number of nests laid, number of eggs in each nest etc. the details of the last twelve years are given in **Annexure-V**.

## **3.2 Timber operations including bamboo and firewood harvest**

### **3.2.1 Silvicultural systems and tending operations**

Prior to 1906 the exploitation of the forest was selective and irregular, only valuable species being extracted to meet requirement. The Sinha's working plan (1970-80) besides aiming at conservation, development and improvement to the forest, also included catering to the growing need of the wood based industries which were established during the same period. The Cuthbert Bay forests falling under Betapur Felling series was earlier kept under Conversion working Circle. The timber harvesting took place during 1994, 1996 and 1997 and 50 ha, 62 ha and 61 ha of forest areas had been extracted respectively from this Protected Forests. Natural regeneration operations have been carried out in this area under Andaman canopy Lifting shelter wood system. The object of management was to improve the growing stock and help the area recover its normal stocking through treatments such as cutting of climbers, removing the unwanted crooked and wolf trees, thinning of congested patches including planting of seedlings, dibbling and broadcasting of seeds etc. Most of the local demand for bamboo and firewood was met by the villagers from the adjacent forests of Betapur and Cuthbert Bay. In order to protect the wildlife habitat the turtle nesting beaches of Cuthbert Bay was kept under the wildlife protection working circle excluding it from the conversion Working Circle. The basic management objective was to intensify protection over the entire area and reduce the biotic pressures. The resource oriented exploitation works were permitted only in areas where tree removals are absolutely essential for the improvement of the crop. Further the traditional forestry works like tending, climber cutting, and removal of M.F.P was minimized. Consequent to the notification of the Sanctuary all the extraction activities were stopped.

### **3.2.2 Even aged systems and uneven aged systems**

In the various working plan periods most of the areas have been managed on selection system which is an uneven aged Silvicultural system. Artificial plantation of casuarinas species has been taken up during 1980 to 1998 and the entire beaches are now covered with naturally grown casuarina species. In order to provide space for turtle nesting action are being taken for stopping the expansion of casuarina plantation towards sea ward side.

### **3.2.3 Firewood harvest and collection**

Firewood is an essential requirement of the local people. This demand is substantially met from the lops and tops collected from the extraction site. Local villagers were given permission to collect fuel wood from the extraction site. Previously there was demand for firewood as such the Working plans have firewood /NTFP working circle. After the Hon'ble Supreme Court's direction from 1996 onwards the Department is collecting the firewood and provides it to the villagers through sale Depot. Sawn fuel is also sold from the Government Saw Mill, Betapur. Introduction of the LPG in the villages also reduced the dependency of villagers on the firewood. Most of the firewood sold in government Saw Mill, Betapur are presently utilized by local institutions only. Now there is not much demand of firewood. After the constitution of the sanctuary the collection of firewood has been stopped and now it is not a significant problem for the Sanctuary.

### **3.3 Non timber forest produce collection**

Various kinds of Non Timber Forest Produce are available in the forests of Cuthbert Bay. The Villagers and families of encroachers staying in and around the forests used to collect MFPs for their livelihood. The Working Plan previously proposed Minor forest Produce working circle which included cane, Bamboo, ballies, thatching leaves etc. Bamboo and cane is locally used in for construction of hut, cottage industries and for fencing. The Local artisans and SSI units use it for making baskets, furnitures, chattais and other articles required locally and earn their livelihood. The collection of Non timber forest produce has been stopped after declaration of the area as sanctuary.

### **3.4 Leases**

There is no leased area within the Sanctuary.

### **3.5 Other programmes and activities**

The Southern boundary of the sanctuary is a mangrove creek and coastal beaches lying beyond the southern boundary of the Sanctuary extend to Betapur No.2. Tourists and Villagers used to visit these beaches which are wide and long in extent. Tourists can reach the beach by walk using 720m long walkway passing through the Mangrove or using a dinghy directly from the Betapur Jetty. No activities are permitted in the Sanctuary.

## **3.6 Forest Protection**

### **3.6.1 Legal status**

No rights/concessions exist within the area of Cuthbert bay Sanctuary which was declared vide Notification No. 62/97/F.No CWLW/WL/3/130 dated 24/04/97 under the provisions of the Wildlife (Protection) Act, 1972.

### **3.6.2 Hunting**

Previously the Farmers were given permission for hunting the deer which was destroying their farm produces. But in 1991 hunting was banned in these Islands with the adoption of Amendment in the Wildlife (Protection) Act, 1972. Excluding the Forest areas fallen under Conversion Circle management of the Cuthbert Bay beaches were done as per the Working Plan prescriptions of Middle Andaman Division and protection was given to the Turtles and its habitats. However hunting of turtles and damaging the habitat is observed as a serious threat to the sanctuary. Declaration of the area as a sanctuary and regular patrolling has succeeded in stopping the hunting of wildlife. In the last few years owing to improved protection measures taken by the Department as well as increased awareness among the people in the zone of influence the turtles and its habitat got adequate protection.

### **3.6.3 Illegal activities**

#### **3.6.3.1 Poaching**

The incidents of poaching have been very rare and due to strict protection measures Poaching problem is under control in the sanctuary area. In the last five years there have been no poaching cases from the Sanctuary area.

#### **3.6.3.2 Illegal cutting of trees**

Incidents of illegal tree cutting are also rare and in the last five years no cases have been recorded. In addition to the strict protection, the other reasons for less number of offences are availability of LPG and sawn timber from the Betapur Saw Mill and in the Sale Depots managed by the Forest Division, Middle Andaman.

#### **3.6.3.3 Illegal removal of NTFP, Encroachment & other illegal activities**

There are very rare incidents of NTFP removal as stated above. In the absence of riverine sand in the Islands, sea sand is the only source for building construction material in these islands. As a result there is always a pressure of illegal sea sand collection on beaches which

are nearer to the settlement area. But being a Protected Area, no sand mining is allowed in the sanctuary area as well as from the nearby beaches. However, there is always a danger of illegal collection of sand from this area by unscrupulous elements residing in the adjoining areas.

There are two pockets of encroachments with 34 families within the sanctuary limits with following distribution as per the latest report.

1. Number of Encroachers in Cuthbert Bay Area: - 26 Families (07 Families have vacated).
2. Number of Encroachers in Dhani Nallah : - 08 Families (05 Families have vacated).

The detail with respect to the encroachers, area & status at present within the limits of the sanctuary is enclosed under **Annexure-VIII** & their GPS location at **Appendix IX**.

The encroachments in the sanctuary have been done mainly by the labourers who were previously engaged for extraction of timber departmentally. The families of the labourers did not vacate the area even after the extraction work was completed. They encroached the land and cleared up for cultivation. At present some encroachers have abandoned the encroached land. As per the policy adopted by the G.O.I all the post-78 encroachers should be evicted forcefully from the encroached forest land without paying any compensation or any rehabilitation package, but since these encroachments were made prior to the notification of the area as a Wildlife Sanctuary the encroachers who are presently residing within the sanctuary limits can be evicted by paying them a suitable rehabilitation package as has been discussed in the later chapters.

These encroachments are on the northern and southern part of the Sanctuary. The local populations carry out subsistence farming for meeting their daily food requirements. The adjoining sea area of the sanctuary is available to local fishermen/ peoples for fishing. These encroachments are adding a lot of biotic pressure on the sanctuary resulting in adverse impacts on the Flora & Fauna of the sanctuary. The encroachers who are especially residing within the sanctuary limits & solely dependent on the sanctuary for earning their daily livelihood are causing more damage & therefore they must be evicted when fresh eviction process to be initiated.

The local population living on the fringes of the sanctuary & the areas encroached inside the sanctuary with habitation, increases the biotic pressure on the habitat & bio diversity of the sanctuary. The dependency of the people on the sanctuary & the nearby forests for fuel wood collection, fodder collection for their cattle, fishing & other allied activities increase the biotic interference on the sanctuary.

#### **3.6.4 Livestock grazing**

Livestock grazing is prevalent near the western and southern border of the Sanctuary because of closeness to villages and habitation. Betapur and Shantipur are the most accessible location of the Sanctuary and hence has considerable grazing pressure. Protection teams were engaged presently to drive the livestock out of the PA.

#### **3.6.5 Wild fires**

The occurrence of wildfire is rare in the Semi evergreen forests. However the uplifted mangrove areas are very prone to fire particularly in the month of February and March. The problem is presently tackled by the engagement of watchers.

#### **3.6.6 Insect attacks and pathological problems.**

There is no record of any major pathological problem or insect attack affecting the flora or fauna of the Sanctuary. This may be indicative of the lack of monoculture and diverse composition of the Sanctuary.

#### **3.6.7 Wildlife Health**

No major health problems noticed in the Sanctuary. Watch and ward was put on alert to drive the livestock from entering the Sanctuary

#### **3.7 Tourism**

The sanctuary offers very good potential for development of eco- tourism. At present the level of tourism is minimal. There is no Guest house in the Sanctuary. The sanctuary has some well defined trekking routes that attracts the hard core trekkers and nature lovers. But owing to the lack of adequate facilities such as nature camps, resting places, trained guides etc, the number of visitors has remained insignificant. The area falling to Southern side of the PA is Reserved Forests and tourist used to visit the beaches and mangroves frequently to enjoy the nature.

### **3.8 Research, monitoring and training**

#### **3.8.1 Research & monitoring**

The sanctuary has experienced staffs and workers who were involved in monitoring the turtle nesting and maintaining the records. There is no sample plot or preservation plot within the sanctuary area. Though there have been some research studies by various Governmental as well as Non-Governmental Organizations with the approval of the Chief Wildlife Warden, consolidated reports are not available and documentation is generally lacking. Monitoring of wildlife population has remained confined to sea turtles. Regular records of the Turtles nesting is maintained by the Department. There has been no comprehensive survey of the biological diversity even though the area is extremely rich in Bio diversity, especially in the groups of invertebrates, reptiles and amphibians.

#### **3.8.2 Training**

There has been no systematic training programme for the staff in the past though many of them have extensive experience of working in the area. However there is an urgent need for the staff to undergo formal training in hatchery management, maintenance and operation of wireless systems, use of GPS instruments, wildlife census operations, enforcement of Wildlife (Protection) Act and rules made there under and related laws.

### **3.9 Wildlife conservation strategies and their evaluation**

Prior to 1997, the Sanctuary area was a part of Middle Andaman Reserved Forests. The sanctuary area has been subjected to various kinds of working such as selection fellings, improvement fellings, softwood plantations, mixed plantations etc. Due to turtle nesting the beaches are managed exclusively for the conservation and development of wildlife under Protection Circle. After the constitution of the sanctuary the focus of management has been kept on protection by establishing anti-poaching camps, and habitat improvement, interventions such as soil and moisture conservation measures, planting of evicted areas etc. One of the major threats to the wildlife has been hunting of turtle. After the adoption of Wildlife (Protection) Act in 1972, hunting has been controlled because of enforcement, awareness among the people as well as change in the lifestyle of the local people. Though protection is not a major threat to the sanctuary management at present but strict protection measures should always be taken up to prevent future problems.

### 3.10 Administrative setup

The Sanctuary is controlled by the Range Officer (WL), Tugapur with headquarter at Tugapur and falls under the administrative jurisdiction of Divisional Forest Officer (WL), Mayabunder with Headquarters at Mayabunder. A flow chart of the administration set up for the Cuthbert Bay Wildlife Sanctuary is furnished at the Table – 4.

The existing pattern of staff by hierarchical levels and scales of pay is given in **Annexure-XV**.

The Range is divided into three beats.

**Table-4**

**STAFF PATTERN OF CUTHBERT BAY WILDLIFE SANCTUARY**

S.NO.	Designation	Sanctioned post	Existing Post	Vacant
1	Range Officer	1	Nil	1
2	Forester	2	2	Nil
3	Head Forest Guard	1	1	Nil
4	Forest Guard	4	2	2
5	Regular Labour	15	4	11

#### 3.10.1 – Infrastructure:

At present Range Office cum residential quarter is available for the Range Officer at Betapur. Three Forest Guards are staying in Govt. quarter at the entrance of the PA at Betapur. The Camp Officer is presently staying in private owned house at Pitcher Nallah. There are three protection camps and the staffs used to do patrolling inside the PA along with the Beat Mazdoors. The heavy rainfall in the area necessitates regular maintenance of these buildings to be habitable. There is one inspection hut inside the PA and few huts for the staffs to rest. One Jetty is available at the entrance point. At present there are no checking barriers maintained by the wildlife division. The information Centre is maintained at the entrance for the awareness of the visitors.

### 3.11 Communication

#### 3.11.1- Patrolling tracks:

Few interconnecting paths were developed for patrolling. Those path will be useful for controlling fire hazards.

### **3.11.2 Wireless network**

VHF set was provided at Range Office and one in the Sanctuary area.

### **3.11.3 Dinghy**

One Halice Dinghy and one fiber Boat is available in the Sanctuary for the movement of staffs and workers in the creek for attending various works.

## **CHAPTER – 4**

### **THE SANCTUARY AND THE INTERFACE LANDUSE SITUATION**

#### **4.1 The existing situation in the zone of influence (ZI)**

Cuthbert Bay is famous for its beautiful and wide beaches as well as the distinctive culture of the people living around it. Cuthbert Bay can be considered as the land of vegetables as villagers as well as encroachers cultivated vegetables extensively and it is sold to nearby villages like Billiground and Rangat. Other commercial plantation crops that are grown include coconut and arecanut. The private lands allotted to the villagers have substantial tree growth therefore the dependence of people on the Government forests are comparatively less. Apart from maintaining and managing coconut and arecanut plantations other livelihood of the villagers include agriculture, Government service, bee keeping, poultry and dairy activities etc. There are only six villages abutting the sanctuary. The total number of villages in the five kilometer buffer zone of the sanctuary is sixteen. The negative impacts like crop raiding and loss of property due to straying of wild animals from the sanctuary are not very prominent in these surrounding villages. Traditionally the fringe residents are conservation oriented and therefore extent of alienation is not very significant.

##### **4.1.1 The location, extent, boundaries and natural attributes of the ZI**

There are 6 villages abutting the boundary of the sanctuary, namely, Padmanabhapuram, Shivapuram, Betapur1, Betapur3, Dharmapur, Thiruvanchikulam. Out of these few villages are touching the sanctuary. Other villages are within the 5 Km Zone of Influence. These villages that surround the sanctuary are not very heavily populated. Moreover, the houses are well dispersed and the villages are not congested. The cattle population is also comparatively less in these villages.

##### **4.1.2 Villages inside and outside the PA, Ethnic identities, traditions, customs, relationships between distinct groups of people, relationship with forests**

Traditionally the people in and around Cuthbert Bay have lived in close association with nature. Many of the families have private coconut plantation having substantial tree growth. The land is maintained for growing coconut, arecanut, pepper etc. People meet their requirements of firewood from their own lands. Agriculture is done on the swampy plain areas which must have been cleared long back. Paddy is grown mostly for self consumption rather than any commercial purpose. In areas where traditional food crops are grown or where

the communities are not engaged in land-based activities, people's dependence on forest is more. To certain extent, some of the demands of the people are also met from the adjoining non-forest wooded government lands. One of the important local demands is of small timber for house construction and manufacture of agricultural implements like plough, harrow, yoke etc. The villages have a mixed ethnic composition. Common language is Hindi. The other languages in use are Malayalam, Tamil, Bengali and Telugu. Many of the families have a member serving in the Govt. service. The traditional festivals are associated with agriculture as well as of religious in nature. The occasion is marked by festivities, feast, sports and games events. Since the inhabitants are from various places from mainland various festivals are celebrated in the whole year and all the villagers used to participate in it.

#### **4.1.3 The state of the People's economy, Vocations, Land use, use of forests and non-forests based natural resources by people and seasonal patterns**

Generally agriculture and marine fisheries are practiced in all the villages surrounding to the Sanctuary and forms a main source of income. The villagers depend on fishing from the adjoining creeks and bays for their livelihood. Betapur and RRO provides landing places for the fishermen and other villagers. Engine dinghies as well as hallice dinghies are normally used. The vocation dominating in the district is growing commercial plantation of Coconut, Arecanut, pepper etc. The important agricultural crop is paddy. Apart from growing plantation or raising agricultural crop, the important vocations in the rural area are carpentry, blacksmith, beekeeping, making small articles with cane or bamboo. Industrialization in rural areas is very limited except for need based industries such as flour milling, rice milling etc. The Labour force is mainly engaged in the Agricultural tenants, Agricultural workers, Home based Industries, Other workers including plantation workers. Most of villagers who own the land are mostly engaged in govt. service and other activities as such workers migrated from West Bengal and other areas used to cultivate the land as tenant. Because of the extremely tough terrain and conditions of work as well as scarcity of labour, the expected wage rate is high.

#### **4.1.4 Implications of the land use and resources dependency for the conservation of PA and PA management practices and their implication on people**

The dependence of people on Government forests is comparatively less in the nearby villages as well as in the buffer of the sanctuary, because of abundance of resources in private

plantations. However the cooperation and goodwill of the local people is very important for long term conservation of the sanctuary. In view of this, the local people are engaged as daily rated workers for watch and ward of turtle nesting as the number of permanent staffs and workers for the sanctuary is grossly inadequate for effective protection. Involving the local people in protection is not only desirable but also indispensable as the outsiders find it very difficult to live in such harsh conditions. The local available manpower is also utilized for habitat improvement works enrichment plantations, building repairs, construction works etc. There is a need to increase the involvement of the local people in conservation and development of the sanctuary through constitution of eco-development committees. Small interventions such as providing LPG connections, smokeless chullahs, solar lighting systems, bee keeping boxes, involving local people as nature guides can be helpful in increasing the positive synergy between the Department and the local people.

#### **4.2 The development programmes and conservation issues**

In A & N Islands, there is a three tier system of decentralized governance i.e. Zilla Parishad at the district level, Panchayat Samithi at the Block level and Gram Panchayat at the village level. The Panchayat Raj Institution is now well established and most of the rural development programme is directly implemented by these institutions. In Betapur and nearby villages various important schemes of Govt. of India were implemented by the A & N administration. The main objectives of various programmes are to generate rural employment, to ensure food security in rural areas and to create durable community assets, socio economic assets and rural infrastructure. Government of India has initiated MNREGA that guarantees an employment of minimum of 100 days to the rural unemployed people. Any person above the age of 18 irrespective of caste or economic condition is eligible to get assured employment for minimum 100 days. Various important schemes are implemented under which credit, subsidy and training is provided to SHGs (Self Help Groups) or individuals (swarojgaris) for taking up activities such as dairying, minor irrigation, animal husbandry etc. Rural people below poverty line are eligible to be the beneficiaries of various schemes. Presently the level of investment in rural development programmes has remained comparatively low. One of the reasons for this is the low density of population and difficulty in executing works in the district because of tough terrain and inaccessibility of areas. Also problems such as poverty and unemployment are comparatively less in these areas . Therefore providing wage employment is not a very attractive proposition for the local people. An

informal discussion was carried out with the PRIs of the buffer zone to ascertain their opinion on the management of the sanctuary and the developmental activities that can be useful to them. They showed a lot of interest to partner with the department in activities such as ecotourism. They also emphasized the need to get the Sanctuary boundary clearly surveyed and demarcated to avoid any conflicts with the Department.

# PART II

## PROPOSED MANAGEMENT

### CHAPTER-5

#### VISION, OBJECTIVE AND PROBLEMS

##### 5.1 The Vision

Considering the People as an integral part of the nature the vision seeks to safeguard the ecosystems, species and genetic diversity to conserve the biodiversity of Cuthbert Bay Sanctuary and to provide benefits to all from biodiversity and ecosystem services.

##### 5.2 Objectives of Management

The area was declared as a Wildlife Sanctuary with the primary objective of providing conservation to the sea turtles which come to the beaches of this sanctuary area for nesting. The Sea falls on the eastern side of the PA and the southern boundary is a mangrove creek. Local fishermen are extracting fish from the sea and the creek surrounding the PA. Safeguarding the ecosystem will provide suitable habitat for nesting (i.e., proper nesting ground). In spite of various biotic pressures the beaches are attracting more numbers of turtle every year as from 2013-14 onwards the mass nesting phenomenon (*Arribadas*) was noticed in the Arguna beach in Cuthbert Bay sanctuary. Thus there is a need to reduce the direct pressures on the biodiversity of the PA and to conserve all the species and its habitat, protect them effectively from natural as well as anthropogenic pressures, prevent establishment of invasive species, develop appropriate eco-development plans to seek participation of local people, promote eco-tourism, create awareness among masses and promote research, survey and monitoring. The following objectives are formulated on the basis of the values recognized and prioritized earlier.

- (i) To maintain the biological diversity by safeguarding ecosystems, species & genetic diversity and to allow species to evolve & function undisturbed.
- (ii) To accord complete protection to the breeding & feeding grounds of rare, endangered species of flora & fauna and restore critical habitat.
- (iii) To reduce the biotic pressures on biodiversity and promote ecotourism to create awareness among the people on the values of biodiversity for its conservation & sustainable use.

- (iv) To Protect and restore mangrove ecosystem which is a breeding ground for various marine species including Salt water Crocodile.
- (v) To Foster economic development of adjoining villages around Cuthbert wildlife sanctuary through eco development programme.
- (vi) To carry out adequate scientific research & establishing monitoring facilities for conservation & management of sea turtle & their nesting beaches.

#### **4.2 Short term objectives**

In order to achieve the Long term objective the Management has to increase the capacity to take up more initiatives and complex conservation issues. To achieve the conservation of the species and its habitat with the help of local communities more fund and resources are needed. The short term objectives are aimed at achieving the long term objectives.

- (i) To provide for conservation & preservation area of Cuthbert Bay wildlife sanctuary and their natural state to protect the sea turtles & nesting beaches including the hatchlings & hatcheries.
- (ii) Provide opportunities for education to students & communities living around.
- (iii) To carryout Research & Monitoring to understand species and habitat.
- (iv) To provide capacity building programmes to the staff of the areas related legal matters & habitat conservation issues.
- (v) To restore mangroves areas in the Cuthbert Bay wildlife sanctuary.
- (vi) To enhance visitor experience in Cuthbert Bay wildlife sanctuary through conservation, education and interpretation.

#### **5.3 Problems in achieving objectives**

Followings are the main constraints in providing effective management to this sanctuary.

##### **5.3.1 Lack of adequate Staffs and labours**

The main intention to declare the Cuthbert Bay Sanctuary is to protect the turtles and its nesting grounds from hunters, predators and other biotic pressure. The beach lying on the eastern side of the Sanctuary is more than 10.00 km long. The eggs of the sea turtles are subject to severe threat from Predators like Water Monitor Lizard, Sea snakes, Stray dogs,

besides illegal collection / hunting by unauthorized persons. Further, many nests were found to be laid in between HTL & LTL of the beaches subject to washed away during high tides. It is believed that only one in a thousand hatchlings survives till adulthood. Depredation of eggs, turtles and hatchlings by feral dogs and other wild animals can be prevented by implementing proper monitoring system for which lot of man power is required. But availability of manpower and fund is limited. Even shortage of trained staff & Labours is a most considerable constraint in managing the day to day works of the sanctuary. Also due to lack of sufficient funds for imparting training to the staff & Labours reduces efficiency of the management practices formulated for the sanctuary.

### **5.3.2 Lack of Infrastructure**

Lack of appropriate infrastructure is one of the major constraints in the effective management of this sanctuary. Presently one Range office-cum-residence building (double storied) has been constructed at Betapur which shall specifically look after the functioning of the Cuthbert Bay Wildlife Sanctuary. The building shall also house a camp office & an information centre to display information on different kinds of marine turtles and also provide information on turtle nesting data of this sanctuary. Infrastructure setup in terms of new furniture & other display items, exhibits for the Information center needs to be developed for which sufficient fund needs to be earmarked.

There are only two labour barracks which are constructed outside the sanctuary area. More buildings to accommodate executive staff and labours are required. Presently the Executive staffs posted in the Cuthbert Bay wildlife Sanctuary have not been provided with any accommodation due to its non-availability. Most of the executive staffs are residing in rented accommodation outside the Sanctuary. Few more quarters are to be constructed in and around the Sanctuary to accommodate more staffs and labours. Also for maintaining the existing Buildings, labour barrack etc sufficient funds is required. Sufficient numbers of watchtower and huts needs to be constructed within the sanctuary limits for the use of Patrolling teams, tourists and researchers. Facility for providing safe drinking water should be extended within the sanctuary which shall be useful for both the tourists as well as by the staffs & labours posted in the sanctuary for protection purposes.

### **5.3.3 Transport and mobility**

Transport and mobility of executive staff are other constraints in effective management. The sanctuary is approachable by road as well as by boat through the creek. There is no vehicle available with Forest Department for this protected area. A utility van is very much essential for transportation of man, materials and seized products. In absence of a utility vehicle the essential commodities meant for the staff & labours who are posted in the sanctuary are carried on head load which not only takes a lot of time but also is very risky at times. In addition two speed boats with OBM (Out board Motor) engines or dinghies with inboard engines are needed to patrol the creeks and the sea around the beach which are frequented by local as well as foreign poachers. All terrain vehicles are also helpful in patrolling activities inside the Sanctuary

### **5.3.4 Lack of Communication**

Limited communication facility is available through VHF sets. A repeater and more handsets are needed to facilitate communication.

### **5.3.5. Livestock grazing and dumping of garbage's**

Few encroachers are still residing inside the Sanctuary and their activities will adversely affects the conservation objectives and the Sanctuary experiences anthropogenic pressures. Cattle grazing by these encroachers and from nearby villages and Garbages comprising organic, inorganic & plastics origin are dumped during high tides are responsible for the habitat degradation in this area.

### **5.3.6 Shrinkage of Turtle nesting beach**

It is observed in recent years that the *Ipomea spp*, a creeper on the sea beach, *Casurina sp* and *Pandanus spp* has shown very profuse growth and natural regeneration towards sea-ward side. As a result the width of beach is getting reduced slowly, resulting in shrinkage of beach areas a result adversely influencing nesting of sea turtles.

### **5.2.7. Tourism in around the Sanctuary**

The part of the beach is also one of the eco-tourism sites of the wildlife sanctuary. Unregulated and high volume tourism will adversely affect the process of turtle nesting.

### **5.2.8 Documentation and monitoring**

Datas are only available on the turtle nesting's and the release of hatchlings with effect from 1997. No details census operations done in respect of other species of flora and fauna. Focus is only done in respect of turtle only. To assess the health of the ecosystem census is also to be made in respect of other species. Basic inventory on natural resources are not available. Study on the socio-economic status of the adjoin villages in zone of influence area needs to assessed. Lack of baseline information on the viable population estimates of major species and their regular monitoring is a major problem in the sanctuary as well as outside the PA.

### **5.2.9 Lack of awareness programme**

Public awareness about importance of catchments areas and its impact of their activities like causing fire, grazing, and throwing garbages in the creek etc. is lacking. Active involvements of locals are needed.

### **5.2.10 Remoteness and lack of infrastructure**

Most of the areas are inhospitable and due lack of infrastructure researchers are not willing to stay in those places and to conduct research. It becomes difficult to generate data for long studies. Further due to paucity of fund and lack of communications only few institutions from mainland are presently involved in the research activities in these Islands.

# CHAPTER-6

## THE STRATEGIES

### 6.1 Boundaries

Boundary description of the Sanctuary is given in chapter 2. The boundaries of the PA in the west and north side is Reserved Forests, east side is sea and the southern side is mangrove creek. Notification of Boundary description is enclosed and marked as **Appendix- 1**.

The northern boundary of Cuthbert Bay Sanctuary meets the boundary dividing Middle Andaman Division and Mayabunder Division. The entire area of Cuthbert Bay Sanctuary falls inside the territorial jurisdiction of Middle Andaman Division. The ecological boundary is beyond the notified area of the Sanctuary. The reserved Forest in the east and north boundaries is extended more than 5km. Wild animals used to move from the Reserved Forest to the sanctuary and vice versa. In Southern side the mangrove creek exists and the Crocodile enters from the creek to bask on the flat beaches of the Sanctuary frequently. In the southern side the wide sandy beaches of the coast extend to more than 2.0 km and turtles also used to nest on this beaches which is Reserved Forest in status. The turtles as well as various marine species used to visit the shores regularly from the eastern and south side. Many villages are situated in the notional eco-sensitive zone of 10km. Preliminary survey was conducted earlier and pillars were erected at various points. All the existing boundary pillars should be verified and repairs need to be undertaken and record should be maintained both at Range Offices and Divisional Office. Due to shifting sand and earth cutting at various places the pillars are getting damaged which needed fresh survey and erection of pillars. If required out sourcing can be done to undertake various delineation works. Regular monitoring of the boundary needed and records should be maintained properly. Routine inspection needed for checking illegal activities and encroachments.

### 6.2 Zonation

The purpose of zonation of the Wildlife sanctuary area is to protect and preserve sensitive components of the ecosystems while facilitating compatible activities. The zonation ensures that areas of high ecological importance evolve naturally with minimal human interference. It also promotes sustainable use, protection of diverse habitats and preservation of important natural resources. The objectives of the zonation in the Cuthbert Bay Wildlife Sanctuary is to:

- (i) Reduce stresses from human activities by establishing areas like Protection zone, Tourism zone, Conservation zone that restrict access to sensitive wildlife populations and habitats.
- (ii) Minimize conflicting use.
- (iii) Eliminate damage to critical and sensitive habitats by restricting human activities in all zones.
- (iv) Prevent heavy concentration of uses that degrade natural resources.
- (v) Provide undisturbed monitoring sites for research and development.

As a part of management the following activities are to be taken up during the Plan period for the improvement of the ecological status of Flora & Fauna existing within the limits of the sanctuary:-

- (i) Regular cleaning of the beach and removal of garbage
- (ii) Controlling Invasion of exotic species of flora and fauna through eradication & translocation.
- (iii) Fencing on the landward side to delimit the sanctuary from the unauthorized entries & trespass.
- (iv) Control the invasion of the growth of casuarinas towards the seawards side to provide a better nesting ground for marine turtles.
- (v) Artificially regenerating the area by planting more littoral species thereby filling the gap created through regular removal of existing exotic species.

### **6.3 Zone Plan**

The following zones are being proposed for achieving the defined objectives:-

#### **6.3.1 Protection Zone**

The Protection zone is created to protect biodiversity by enforcing strict protection regulation with barest minimum human disturbances. The zone encompasses large contiguous, diverse habitats in order to protect and enhance natural process of ecosystem to evolve species. Allowing certain areas to evolve in or return to a natural state in order to preserve the diverse range of resources and habitats throughout the park. Regulations of ecological reserves are designed to meet the objective of this zone by limiting all activities except research, protection, conservation and other permitted activities in the management plan. The activities of the protection zone are having overlapping with areas of conservation

zone & ecotourism zone. The entire Sanctuary is further divided into two zones with establishment of permanent protection camps such as;

1. Protection Zone- I comprising the northern part of the Sanctuary
2. Protection zone- II comprising Southern part of the Sanctuary

### **6.3.2 Conservation Zone**

The Conservation zone protects biologically important areas and is designed to reduce conflicts and sustain critical habitats. Regulations for conservation zone are designed to limit all activities except research to a limited extent that do not threaten natural resource protection. The activities of the conservation zone are having overlapping areas with Protection zone. The Arguna area which is the site for mass nesting of Olive Ridley Turtle is comprising **0.024 sqkm.** and is delineated as conservation zone.

### **6.3.3 Eco -Tourism zone**

The Eco-Tourism zone is a special use area and is set aside for visitors to visit and appreciate the biodiversity. The zone may confine or restrict the activities related with Eco-tourism. Access is restricted to permitted entry only. The Eco-tourism zone includes the areas to watch turtle nesting, catch and release of turtle hatchlings etc. There is a visitor use area which has facility such as changing rooms, toilets, rest huts, eateries etc. It has overlapping areas with protection zone. The tourism zone comprises an area of **0.20 sqkm.**

### **6.3.4 Eco-development Zone**

This zone will be overlapping zone within the limits of above identified zones and will also include the 2 km eco-sensitive zone from the Sanctuary boundary.

## **6.4 Theme plans**

Boundary demarcation

Habitat Improvement

Turtle Conservation

Protection

### **6.4.1. Boundary demarcation and its maintenance**

Boundary demarcation and maintenance of land records are essential to check encroachments. The staff should know exactly their areas under their control.

## **6.4.2 Habitat Improvement Plan**

Considering the important species the turtle which visit the beaches in large numbers various steps are taken to ensure safe nesting ground for turtle nesting. The entire stretch of sandy beach throughout the length of the Cuthbert bay wildlife sanctuary is the nesting ground for sea turtles. The beach is backed by vegetation of Littoral forest, mouth of perennial stream. The following activities are to be practiced for better habitat for turtle.

### **6.4.2.1 Eco-restoration of Nesting Beach**

The growth of Casuarina which was planted by the department & which regenerated naturally needs to be checked as the Casuarina plantation is now regenerating very fast and spreading towards sea ward side. As a result the width of the beach area is getting reduced, which can result in shrinkage of area for nesting. It is necessary to remove the planted trees of Casuarina and also check their natural regeneration so as to restrict their spread towards seaward side and a minimum of 100 m width from high tide line is required to be kept clean and free from any obstruction for easy management of turtle nesting. Also a detailed scientific study needs to be undertaken on the growth of Ipomea which is fast invading the sea beach & thereby reducing the beach area for turtle nesting.

### **6.4.2.2 Maintenance of nesting beach areas**

Garbage comes and settles on the beach due to wave action. Lot of organic debris is washed down along the beach during monsoon through the Betapur nallah, which flows along the southern boundary of the Sanctuary. The beach should be kept clean particularly during the nesting season to facilitate nesting. For execution of said work the services of the departmental Labours along with daily rated Mazdoors are also engaged. This particular work requires special attention along with sufficient labour strength to ensure that the garbage is not deposited along the beach & the nesting site.

### **6.4.2.3 Planting of Littoral species.**

In view of conserving the local & natural biodiversity the introduction of exotics, many of which usually became obnoxious are to be eliminated. Such introductions intentionally or accidentally pose a great threat to turtle breeding and other indigenous species. The beach areas restored under this programmes shall be planted with Littoral Species like Sea Mohwa (*Manilkara littoralis*), Poon ( *Callophyllum innophyllum*), Karanj (*Pongamia spp*), Arguna (*Cycas andamanensis*).

There has also been infestation by various exotic species of weeds, particularly Eupatorium which could prove to be a major deterrent to the regeneration of degraded forest areas, especially areas freed from encroachment.

It is therefore proposed that

- (i) No exotic species of fauna or flora should be introduced into the park. Accordingly, suitable standard operating procedures (S.O.P's) will be developed for the purpose.
- (ii) A time bound action plan shall be drawn to deal with the exotics already in the area including weeds & their removal/eradication should be taken up on priority in consultation with WII, Dehradun who has already been asked by the department to suggest measures for control of exotic species in Andaman & Nicobar Islands.

#### **6.4.2.4 Reclamation of Encroached Areas**

1. A suitable action plan for removing the encroachers from the limits of the sanctuary may be envisaged under which suitable rehabilitation programme for the encroachers can be formulated.
2. The present status of the encroachers residing within the sanctuary can be categorized into following categories:-
  - a. Families of encroachers who are not residing within the encroached land but are using the same for cultivation or any other purpose.
  - b. Families of encroachers who are residing within the encroached land & are solely dependent on it for earning their livelihood.
  - c. Families of encroachers who have completely abandoned the encroached area.
3. For the first two categories a suitable rehabilitation package in terms of monetary remuneration can be proposed & kept in the Centrally Sponsored Scheme, thereby with which the encroachers can be encouraged to vacate the area & settle elsewhere.
4. The area completely abandoned by the encroachers, must be retrieved/reclaimed immediately by carrying out plantation of various littoral & other endemic species.

#### **6.4.2.5 Establishment of Nurseries**

The Cuthbert Bay Wildlife Sanctuary comprises as many as several forest types of Andaman & Nicobar Islands. Some of the forest types are very specific and requires special attention for regeneration and reproduction like, mangrove forest, littoral forests etc. In addition to that there is requirement of seedling for Habitat Improvement and reclamation of

evicted encroached land. Therefore proposes to establish location specific small nurseries for proper and scientific management of the sanctuary.

#### **6.4.2.6 Fencing on the landward side:**

Keeping cattle away from the PA limits and ensuring that there is no grazing within the sanctuary area is necessary for maintaining proper habitat for nesting at beach area. This may be done through fencing along the landward side boundary (western side) of the sanctuary to prevent encroachment and entry of cattle and stray dogs.

#### **6.4.3 Turtle Conservation Plan**

Marine turtles are large, air-breathing reptiles that live in tropical and sub-tropical seas throughout the world. Fossil turtles date back to the Triassic Era some 200 million years ago. Turtles, like all reptiles, are cold blooded (*ecto-thermic*). Their body temperature is the same as their surroundings. The most obvious characteristic of this group of reptiles is the presence of a protective shell. The shell is composed of three parts - an upper shell, or carapace, attached to the lower plastron by a bony bridge. Instead of teeth, turtles are equipped with a horny bill. Marine turtle limbs have evolved into flippers and their body shape is streamlined.

Five of the seven species of sea turtles found worldwide are reported to occur in Indian coastal waters and the Bay Islands. These are the Olive ridley (*Lepidochelys olivacea*), Green sea turtle (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Leatherback (*Dermochelys coriacea*) and Loggerhead (*Caretta caretta*). Except for the Loggerhead, the remaining four species nest along the coastline of these Islands.

All marine turtles are oviparous. Marine turtles typically mate at sea a few weeks prior to nesting and only the females come ashore to nest. The males are never found on the coast, though they have been sighted in the coastal waters. Nesting activity normally takes place in the cover of darkness. Female turtles dig nest, which is flask shaped beyond the high water mark with the help of their flippers. Each female would lay approximately 150 eggs, which are ping-pong (table tennis) ball size and soft shelled.

Incubation period for these eggs is usually between 45-70 days depending on the species. The eggs are closely packed and in contact with one another. Metabolic heating within the nest helps to speed up the hatching process in the final stages of incubation. The gender is temperature dependent, meaning higher the temperature more number of females, lower the

temperature more number of males. The hatchlings emerge at night and head towards the sea guided by the glow of the moon and the stars, coupled with the sound of the waves. While they walk towards the sea imprinting takes place that enables them to return to their natal beach for nesting when they mature. Marine turtles are subject to dwindling habitation - nesting sites and foraging sites. Despite international recognition of critical status, their population has been decreasing rapidly.

#### **6.4.3.1 Maintenance of existing hatcheries:**

There are three existing hatcheries on the beach where freshly laid eggs are transferred and buried in sand. Presently the three hatcheries appear to be sufficient considering the number of turtles coming for nesting. However one more additional hatchery is needed to be constructed near Arguna creek as past records reveals turtle nesting in the particular area & as the area is far away from the existing hatcheries shifting of eggs from the far away location to the existing hatcheries results in higher mortality of hatchlings. Thus it is proposed that in addition to the existing 03 hatcheries another hatchery should be constructed in the Arguna area. Also apart from these hatcheries if in future the need for any further additional hatcheries is felt than the hatcheries should be spatially dispersed widely.

The G.P.S readings of the hatcheries are as follows:-

1. Hatchery "A" :- N 12°37'37.8" & E 92°57'27.2"
2. Hatchery "B" :- N 12°37'57.4" & E 92°57'28.9"
3. Hatchery "C" :- N 12°36'59.3" & E 92°57'27.9"

#### **6.4.3.2 Mass Nesting phenomenon and their conservation**

Mass Nesting is a spectacular phenomenon exhibited by the Olive ridley Turtle. During this phenomenon, the nesting mothers congregate on the sea during some particular period of peak nesting season and thereafter march for nesting on that particular site and nested there. There is report on nesting of thousands of olive ridley turtles at particular period. The beach of Gahirmata Wildlife sanctuary is one of such spectacular sites where mass nesting is taking place in regular basis. In the recent times such types of mass nesting phenomenon of Olive ridley turtles were exhibited at Arguna beach of Andaman & Nicobar Island under Cuthbert Bay Wildlife Sanctuary. The Mass Nesting Records of last few years is furnished below:

Sl.No.	Year	Name of the turtle species	No. of nesting	No. of nest hatched out	No. of hatchling released
1.	2015	Olive Ridley	9745	9745	570270
2.	2016	Olive Ridley	10158	10158	679184
3.	2017	Olive Ridley	19230	19230	1293512
		Green Sea	01	01	98

#### **6.4.3.3 Management of Mass Nesting Nests**

It is recorded that several thousand olive ridley turtles are nesting at Arguna in some particular night. The length of the beach is **600** Meter and average width is **40** Meter. It is being observed that the beach is so overcrowded with nesting mothers; they dig the freshly nested nest and lay eggs on that nest. Several nests were found to be get damaged due to overcrowding of the beach. The nests of mass nesting are managed in situ. Sometimes found that nests are laid on intertidal zone. The nest which were found vulnerable to be get damaged any of the reason mentioned above, are transferred to a temporary Hatchery constructed for the same purpose only.

The Water Monitor Lizard and domestic dogs, cattle are causing damage to the nests and eggs of turtles. It is not practicable to construct Hatchery and transferred all such eggs in the hatchery. It is being proposed to fence the entire beach from three sides with plastic net specially prepared for this purpose of desirable mesh size so that the natural predators, Dogs & Cattle can be kept away from the nesting beach.

#### **6.4.3.4 Release of Hatchlings**

The hatchlings normally come out of the nest during night hours. The “cave in” starts about 4-5 hours ahead of emergence of hatchlings. Normally the newly hatched hatchlings do not come out of the nest until the sand become cool. The hatchlings are released immediately after emergence. But if any hatchlings emergence during day times they are released during evening hours after the sand becomes cool. The hatchlings are allowed to crawl on the beach and reach up to the water level. A watchman is kept round the clock to keep watch on nests & routine maintenance of hatchery. The record maintained on emergence of hatchlings and their release in the past years is furnished below.

**TABLE**

**Annual release of hatchling from various hatcheries of Cuthbert Bay Sanctuary from 2009-2014 (in numbers)**

Name of Hatchery	Species	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Dhaninallah 'A'	Green Sea	11110	5169	5569	8200	12942	42990
	Hawksbill			70	353		423
	Leather back		90				90
	<b>Total</b>	<b>11110</b>	<b>5259</b>	<b>5639</b>	<b>8553</b>	<b>12942</b>	<b>43503</b>
Dhaninallah 'B'	Olive Ridley	18332	12860	6664	11898	21520	71274
	Green Sea	181		255	706	103	1245
	Hawksbill						
	Leather back		180				180
	<b>Total</b>	<b>18513</b>	<b>13040</b>	<b>6919</b>	<b>12604</b>	<b>21623</b>	<b>72699</b>
R.R.O 'C'	Olive Ridley	11244	14815	10340	12795	8488	57682
	Green Sea	349	438	76	149		1012
	Hawksbill						
	Leather back		122				122
	<b>Total</b>	<b>11593</b>	<b>15375</b>	<b>10416</b>	<b>12944</b>	<b>8488</b>	<b>58816</b>

The hatchlings of mass nesting nest were allowed to emerge out of the nest and crawl on the beach up to watermark. No augmentation is done during emergence & crawl of mass nesting hatchlings. However the watchman is engaged there for round the clock to prevent predation of damage by any external entities.

**6.4.3.5 Turtle Nesting Monitoring**

The nesting beach is kept under surveillance for round the clock during nesting season especially during night hours. In order to count the number of nesting every night on the beaches, regular night patrolling at an hourly intervals are conducted. The patrolling starts at 1800 hours and continued up to 0600 hours of the next day morning. Daily visit of turtles are spotted, their nest identified, collected eggs and relocated at artificial hatchery. The patrolling team is divided into three group viz. RRO area, Hatchery A & B area and Arguna area. Strict vigil is also kept for any illegal collection or hunting of either sea turtle or turtle eggs.

**6.4.4 Protection Plan**

Protecting the Sanctuary area from illegal activities of poaching, grazing, sand mining, encroachments etc. is the most important objective of the management. The main thrust of course will be on providing adequate protection to turtle nests and ensuring that the eggs laid in the nests are hatched to the maximum possible extent and are released safely in the sea. The sanctuary does not have any village within its jurisdiction; however there are encroachers in

the vicinity which put anthropogenic pressures on the Sanctuary's natural resources mainly for the collection of NTFP (Non-Timber Forest Produce) and sometimes for illegal collection of sand.

#### **6.4.4.1 Protection Camps:**

Presently, the protection is done by a camp officer of the rank of a Forester along with two forest guard and 05 mazdoors. He looks after protection, tourism and other developmental activities. During the nesting season a separate protection camp should be made functional near the Arguna area which should be headed by an officer not below the rank of a forester duly supported by at least 02 forest guards & 05 workers. Apart from this camp another camp headed by a camp officer not below the rank of Deputy Ranger should be posted under the direct control of Range Officer who shall look after all the protection related works & also provide reinforcements on as & when required basis. The protection work should include regular patrolling, constant vigil on the boundary against prospective encroachers, along the beach to deter miscreants involved in illegal sand collection and poaching of marine resources.

#### **6.4.4.2 Central Protection Unit**

The present strength is felt grossly insufficient for effective management of the sanctuary. It is felt that there should be a separate Range under the control of a Range Officer for the overall management of this Sanctuary. Also a Central Protection unit should be formed which shall function from the Range Office & the Range Officer himself shall be the over all In-Charge of the C.P.U. the unit should be provided with a utility van for the transport of materials for developmental works and also for collection and transport of seized materials. The Range officer and the camp officers may be provided with motor bikes and one or two speed boats with OBM or dinghies with inboard engines are also required to give an impetus to the protection efforts. Provision should be there for providing small fire arms to the Range Officer & the camp officer for carrying out effective patrolling. The staff involved in the protection should be provided with all needed equipment like VHF hand held sets, GPS (Global Positioning System), Arms and ammunitions etc.

#### **6.4.4.3 Providing incentive and facilities to the staff**

Protection work requires lot of commitment & dedication on the part of the staff. Highly motivated staff can render exemplary services whereas disinterested staff even well-equipped

can prove ineffective. Hence it is very vital that the staff is provided lot of motivation & morale of staff is kept high. The following steps will be useful in this regard:-

- (i) Providing monetary incentive to the field staff as per the provisions of Wildlife (Protection) Act, 1972.
- (ii) Maintaining records of performance of each staff & suitably rewarding selected number of staff annually for the highest number of cases booked, material seized etc.
- (iii) Conducting annual training & moral boosting courses for the field staff.
- (iv) Providing accommodation to the family of protection staff close to places where basic education & other facilities are available. Two sets of Type- II twin sets quarters outside the sanctuary is very much essential for accommodating the staffs posted in the sanctuary. The existing labour barracks for the Labours need to be repaired. Presently there are only two labour barracks which are constructed outside the sanctuary area. More buildings to accommodate executive staff and labours are required. Presently the Executive staff posted in the Cuthbert Bay wildlife Sanctuary have not been provided with any accommodation due to non-availability. Most of the executive staff are residing in rented accommodation outside the Sanctuary. Also for maintaining the existing Buildings, labour barrack etc sufficient funds is required.

#### **6.4.4.4 Report on Patrolling**

There should be a system of periodical report of patrolling highlighting the occurrence of the activities, steps taken to detect & apprehend, step taken to avoid happening of illegal activities. A protection duty proforma shall be maintained in which the details of the protection duties carried out by the staff shall be recorded. The said proforma should be sent to the concerned Range every month & upon verification the same should be forwarded to the Division Office. During the inspection of any senior officials the said register containing the details of the proforma should be produced. The details of the proforma is placed at **Annexure-IX**.

#### **6.4.4.5 Maintenance of Field Diary & Offence Register**

All the executive staffs should maintain weekly diaries which should be written on a daily basis. The diaries should contain detailed information on the area visited, detailed observation in respect of forest vegetation, animals sighted, signs of unauthorized camping & any other relevant information. The copy of the same should be sent to the concerned Range Officer.

Apart from the weekly diaries the Range Officer should also maintain a Range Offence Register containing the details of the cases/offence booked under the particular Range Jurisdiction. The details of the same should be sent to the Division office every month to facilitate better monitoring of the court cases.

# CHAPTER-7

## ECOTOURISM, INTERPRETATION AND CONSERVATION EDUCATION

### 7.1 General

There is a great potential in this sanctuary to attract a large number of visitors including tourists, nature lovers, wildlife enthusiasts, researchers, environmentalists etc. Presently the tourism activities are limited to few months i.e. from November to April. The sanctuary has panoramic view of sea beach, mangroves, littoral and tropical forests with variety of avifauna. The sanctuary falls adjacent to the Andaman Trunk Road as such lot of tourists moving from Port Blair to Diglipur often halt at Betapur and visits the mangroves and beaches using 715 mtr. long timber walk way. Mass turtle nesting was observed from 2014 at Arguna beach in the Cuthbert Bay sanctuary and if this potential is systematically and scientifically harnessed then it would have several positive impacts including creating awareness among people regarding need for biodiversity conservation.

There is a tourist lodge namely hawkbill nest run by the tourism department at Betapur. In addition there is a guest house of Andaman Public Works Department (APWD). These lodging arrangements are presently sufficient for providing accommodation to tourists, but in future more accommodation facility may be needed. Forest department does not have any rest house nearby. The nearest forest rest house is located in Bakultala, Middle Andaman Forest Division. Entry in the sanctuary is subject to a valid entry permit which is issued by the Range officer, Wildlife Range Tugapur. The administration has imposed ban on the use of plastics in the protected areas.

In addition to its rich biodiversity value, the sanctuary provides ample opportunities which may have significant impact on the socio-economy of people living in the vicinity of the sanctuary.

The long sandy beach and the nature trail are good attractions for tourists who visit this area. Increases in number of tourists certainly improve the economy of local villages adjoining the sanctuary. Viewing the turtle nesting is a source of attraction to tourists, scientists, researchers, environmentalists, etc. It may provide new employment opportunities to local inhabitants in the nearby villages. The youth may be employed as tourist guide and also in providing tourism supporting activities outside the sanctuary area e.g., running small shops, restaurants, operating fiber boat/engine dinghy, travel agents etc. One Interpretation

center cum Range office building is available at Betapur for providing information to the visitors. One can reach the sanctuary directly from Betapur through the mangrove creek with the help of fiber boat/engine dinghy.

## **7.2 Objectives**

- i) Promote responsible Eco-tourism which can enrich the experience of the visitor and win support for the sanctuary and conservation of its biodiversity.
- ii) Develop multiple opportunities for eco-tourism and enjoyment, facilities like guided and un-guided nature trails, information centers, with proper signage will help in spreading the message of conservation among people & also will also justify the department's mandate & it's role in the entire conservation plan.
- iii) Usage of local material and involvement of local people to the extent possible in all the eco-tourism related activities will also boost economy of people residing near the sanctuary & will also provide ample opportunity for local unemployed youth.
- iv) Provide wilderness experience to visitors through regulated ecotourism activities like trekking, nature walk and day camps.
- v) Develop the sanctuary as a center for conservation awareness by conducting various nature awareness programs.

## **7.3 Issues and problems**

The sanctuary is situated at 250km from Port Blair and due to remoteness and inadequate infrastructure only few tourists are able to visit the site. Since the entire beach area is utilized by the Turtle for nesting purpose from the month of November to May there is need to regulate the tourist movement in the beaches during the above period. Low volume ecotourism activities shall be initiated in the current plan period. Regular monitoring is required to assess the impact of the ecotourism on the turtle population. A long stretch of land in between Port Blair and Betapur falls under Tribal reserve area as such the vehicle movement on ATR is restricted at present. Considering the fact that increased agriculture practices and other developmental activities may put adverse impact on the biodiversity of the area it is necessary to involve the unemployed youth of the nearby villages in ecotourism activities which can provide a sustainable livelihood to them.

The creek at the southern side is infested with Crocodiles as such the operators of fiber boats and engine dinghy required to take all precautions and safety measures during the movements

of the boats in the creek to avoid any harm to the visitors as well as disturbances to the wildlife. Number of visitors inside the sanctuary is also to be restricted for avoiding disturbances to turtle nesting.

Unregulated movement of visitors and tourism may create problems to the turtles which reaches the shore for nesting. The movement of people on the beach during night with torch light and other illumination scare the movement of turtles due to which nesting turtles and emerging hatchlings get disoriented and move towards the source of light rather than to the sea. Tents, umbrellas etc. on the beach obstruct female turtles from reaching suitable nesting locations. Tourist infrastructure in the guest house in beach area makes artificial illuminations which scare the movement of female turtle coming towards beach for nesting.

Precautionary measures are to be adopted to mitigate the above problems. Tourists visiting the sanctuary should not be permitted to enter the sanctuary without any authority after sunset. Camping for the tourists should not be permitted at sites prone to turtle nesting. Measures should be taken to keep the entire sanctuary limit as a “plastic free zone”. No permanent structure should be raised in the turtle nesting beaches within the sanctuary limits. Sand mining not to be permitted within the sanctuary limits. During night hours even the department staff on duty should not be permitted to use any kind of illumination within the sanctuary limits.

## **7.4 The Strategies**

### **7.4.1 Identification of a Zone**

In order to promote ecotourism in this sanctuary potential areas are to be identified which are fit for ecotourism, facilities to be developed for the tourists with sufficient budget for maintenance of these facilities and suitable measures to be adopted to cause minimum disturbance to the wildlife and its habitats.

Two Zones are identified in and around the Sanctuary for developing it as ecotourism site and for initiating the eco-tourism activities. Eco-tourism facilities will be developed on one ha area at the entry point of the Sanctuary on its south-east side. Visitors can watch the turtle nesting in this zone.

One ha area in transition zone can be developed for eco-tourism activities containing Interpretation Centre, watch tower, nature trails, camping places with water and toilet

facilities. All other required facilities will be developed there for conducting nature camps for the use of students and general public. All the tourism related activities shall be restricted within the “Eco-tourism zone”.

Local unemployed youth from the adjoining area of the sanctuary may be trained as tourist guides which will also act as a source of employment for them.

The Department in coordination with the local Panchayat Raj Institution body can evolve a mechanism under which the local people can be encouraged to operate small canteen/ souvenir shop outside the sanctuary limits which again will benefit the local people & also will act as a means of advertisement for the sanctuary. The visitors can take a walk inside the forest in trails to experience the variety of forests and the avifauna. Provision for a nature trail of 02 km within the “Eco-tourism zone” will cover this aspect suitably. Ample scope for tourists & wildlife enthusiasts will also be there in terms of bird watching & also camping within the “eco-tourism zone” only during day hours. The long sandy beach will be a good attraction for tourists who visit this area. The turtle nesting will be a source of attraction to tourists.

Provision of adventure tourism within the sanctuary limits may not be permitted as the same may cause any kind of adverse impact over the conservation & protection measures that are being adopted for the turtles visiting the sanctuary.

The following action points are envisaged for promoting the ecotourism:-

- (i) Publicity of this sanctuary needs to be done both through electronic and print media such as newspaper, radio and doordarshan, public hoardings and banners, distribution of free pamphlets etc.
- (ii) Tour packages through private entrepreneurs may be encouraged with regular terms and conditions.
- (iii) Web based advertisement may attract lots of tourists.

#### **7.4.2 Infrastructure Development**

The Ecotourism sites in and around the sanctuary and visitor’s interpretation center at Betapur may be developed for the benefit of the visitors. One ecotourism site is to be developed at Dhaninallaha. Presently a few resting sheds made of local materials are available

for tourists towards the Dhaninallah side in the transitional zone of the sanctuary. More such tourist facilities including changing rooms, huts, sheds etc. are needed. Another ecotourism camp is to be established at the south end of the sanctuary with all ecotourism facilities like camping place, rain shelters, umbrella huts, watch towers, changing rooms and toilet facilities. These structures should be made away from the beach so that the turtle nesting area is not affected and so the turtle nesting. Every year separate funds should be allotted under this head with various new facilities for the convenience of the tourists which shall be constructed & also for maintenance of the existing infrastructure within the eco-tourism zone of the sanctuary limits. The department has constructed an eco-hut, toilet & a ring well inside the sanctuary for the tourists visiting the sanctuary under the CSS 2012-13.

Under the eco-tourism plan the department will create new infrastructure by using NTFP & ecofriendly material in terms of round huts, changing rooms & rest rooms etc. Two watch tower may be established at entry point and at southern sea shore. A Wooden Jetty shall be made behind the Range Office at Betapur for the movement of engine dinghy. Action to be taken to provide appropriate water transport for the visitor mobility. Authorized engine dinghy or fiber boat shall only be allowed to take visitors up to this point.

It is very important that a wildlife sanctuary should have an interpretation centre. The presence of an interpretation centre ensures that the protected area serves as an education centre, research base besides entertainment spot. The interpretation center will provide a better scope for educating the visitors as well as the dwellers within the sanctuary & the periphery of the sanctuary.

To cater to this need a new Range office-cum-residence building has been constructed at Betapur. The building will house a full fledge Range office which shall specifically look after the functioning of the Cuthbert bay Sanctuary. The building shall also house a Camp office & an Interpretation centre for the tourists who shall be visiting the Cuthbert bay sanctuary. Although the interpretation centre is in a very nascent stage, it shall display information on different kinds of marine turtles, other wildlife and also provide information on turtle nesting data of this sanctuary. Brochure and other publicity materials will also be distributed from this centre. Infrastructure setup in terms of new furniture & other display items, exhibits for the interpretation center needs to be developed for which sufficient fund needs to be earmarked.

### **7.4.3 Regulations, monitoring and evaluation**

Visitor programs / activities within the boundaries of the sanctuary are fully under the control of the management as such a comprehensive visitor management plan shall be developed for the Sanctuary. Proper regulations and guidelines are to be framed and notified. The following points are to be taken in consideration while framing the regulations.

Determine the exclusive season for permitting the trekking activity.

Diving/snorkeling may not be permitted within the sanctuary limits as this may cause disturbance/ hamper/ damage the turtle nesting sites.

Photography within the sanctuary limits may be permitted provided on payment of the prescribed fee as may be notified.

Provision of tourist guides with the trek groups and their training.

Publicity on trekking and interpretation programs.

Strict obedience of Do's and Don'ts by all.

Involvement of local people in as guides.

Fixed timing for trekking activity.

Any other relevant issue related to trekking activities in Sanctuary.

Publicity of this Sanctuary needs to be done both through electronic and print media such as newspaper, radio and Doordarshan, public hoardings and banners, distribution of free pamphlets etc.

Tour packages through private entrepreneurs may be encouraged with regular terms and conditions

Web based advertisement may attract lots of tourists.

Regulations in the plan shall also address conduct and responsibility of visitors in visitor complex and in the field, use of PA facilities including transport and rules to be observed by other agency personnel while within the PA boundary or on the land controlled by PA authority. None of the other agencies should be free to use their discretion whether they be government or private enterprises.

So far, no carrying capacity study was conducted with respect to maximum visitors the area can support with minimum ecological damage. Carrying capacity for visitation is to be

assessed and fixed. Regular monitoring will help in identifying the impacts of visitors on the Sanctuary.

The nature camps shall be conducted as per guidelines approved by Chief Wildlife Warden. The periodic revision of the same in due course will also be binding while conducting nature camps. No visitors may be permitted inside the Sanctuary without a trained guide. Plastic is totally prohibited in the sanctuary and this will be ensured by the guides and staff on duty. Visitor's book is to be maintained at Information centre and the feedback is to be obtained. Visitor use should be monitored and pressures on habitat and infrastructure should be evaluated, including the efficiency of regulations in providing tourism related experience and education. The results of the evaluation should be used for improving strategies. The PA management shall publish annual report on nature education and visitor management. There is no restriction with entry of tourists. Tourists can enter the sanctuary with a valid permit. At present there is not much impact of tourism on this sanctuary as there are few visitors.

# CHAPTER-8

## ECO-DEVELOPMENT

### 8.1 Introduction

The most important component in conservation strategy is to attract people's participation. This can be achieved through measures like formation of Eco-development committees. The first & foremost step in carrying out Eco-development activities is to identify the dependency of the population outside the peripheral area & within the sanctuary limits over the protected area based on which Entry point Activities can be formulated & executed. This will not only reduce the dependency of the population on the sanctuary but also motivate the people to participate in a more positive manner towards the conservation measure.

### 8.2 Objectives:-

- i. To improve income levels of villagers which will reduce unemployment and the dependency of the local population on the sanctuary.
- ii. To motivate the people & increase their involvement in the conservation measures.
- iii. To restore degraded habitat by involving local communities in conservation of natural resources.
- iv. To educate the local people about the hazards that may be caused to the wildlife & nature by the daily activities practiced by them.
- v. To spread the message of conservation & nature awareness & it's importance for the survival of the mankind & future of their own children.

### 8.3 Specific issues

#### 8.3.1 Locating the Area for Eco-development activities

Eco-development planning is a complex and dynamic process involving several stakeholders. Therefore a number of issues need to be properly understood before launching such programme in the Sanctuary like the location of the area where to initiate the activities, how to take up the activities etc. There are about six village wards namely Padmanabhapuram, Betapur, Dhrama puram, Thiruvanchikulam, RRO, etc. in Shivapuram gram panchayat located outside the Cuthbert Bay Sanctuary. The Betapur nallaha, Mangrove Forests and the Littoral Forest (RF) falls beyond the southern boundary of the Sanctuary

which can be taken up under eco-development programme. Due to shortage of land in periphery of the Sanctuary it may not be possible to undertake many of the activities therefore it is better to look for Panchayat lands or community lands for biomass generation activities like fuel wood and fodder plantations which can cater to the minimum basic needs of the local communities.

Few forest encroachers are also residing inside the Sanctuary and as per the Hon'ble Supreme court direction they are to be evicted. Since the Forest encroachers are to be shifted from the Sanctuary only intermittent activities that minimize the impact of people on PA should be taken up. Care should be taken to see that no new or permanent structures are developed in such encroached areas. Shifting is a process which requires time and meanwhile to avoid any harm to the PA limited eco-development activities for such areas will not only help in reducing the impact of the people on the Sanctuary but will also ensure a good communication between the Encroachers and the Authorities. The area adjacent to the Sanctuary is Reserved Forests and as such a number of on-farm and off farm activities can be taken up under eco-development programme and it can be linked even with the JFM activities coordinating with the territorial division in implementation.

**8.3.2 Identification of impact zones:-**The villages on the fringe of the Sanctuary have variety of impacts due to their resource dependencies and similarly the Sanctuary has impacts in the form of crop damage and other human crocodile conflicts on the villagers and encroachers. In order to initiate the Eco- development programme one has to identify the mutual impact zone of the Sanctuary. All the nearby settlement villages were to be surveyed and their dependency on the PA is to be assessed.

## **8.4 Broad strategies**

### **8.4.1 Nature Education and Awareness Generation Plan**

In recent times the best way to conserve any protected area is considered to be through involvement of the local people and for this it is essential that they are educated properly about the importance of nature and environment. Lot of damage to the habitat in an ecosystem is done by the local people living around out of ignorance only. If they understand the value of biodiversity and ecosystem, and how conserving the natural resources provide them tangible and intangible benefits, they will render their co-operation in conserving the nature and environment around them.

For this sanctuary which is declared mainly for the conservation of sea turtle by providing them suitable nesting site, the nature education programme should aim at providing them information about turtles, their role in ecosystem, their nesting behavior and how this sanctuary can provide them tangible and intangible benefits. The following programmes can be taken up as part of nature education and awareness generation plan:

- (i) Organizing regular nature camps for school children, fishermen, PRIs (Panchayat Raj Institutions) etc.
- (ii) Organizing workshops, seminars, film shows on turtles in schools and village community halls.
- (iii) Printing of publicity materials in local languages and distributing them to locals and also to tourists.
- (iv) Placing information boards and hoardings at strategic points so that they are visible to people entering the sanctuary.
- (v) Construction of an information centre made entirely of local eco-friendly materials away from the beach where important information on marine turtles is provided.
- (vi) Organizing lectures in the schools and village community halls on importance of biodiversity, Island ecosystems and sea turtle for spreading knowledge.

#### **8.4.2 Training for tourist Guide**

The Eco-tourism in the Cuthbert Bay wildlife sanctuary shall be organized through Eco development committee. The tourist guide shall accompany each group of tourist to give them information about wildlife sanctuary, activity, key species & brief about such species, what to do and what not to do in the sanctuary. The tourist guide shall be imparted with basic training on hospitality management and basic knowledge about Cuthbert Bay wildlife sanctuary & its activity. The Management Authority shall be responsible for activity of the tourist guide inside sanctuary and their charges to be paid by the tourist.

#### **8.4.3 Involving the Forest Encroachers in EDC**

Forest encroachers are to be evicted from the Sanctuary and in order to reduce their impacts on the sanctuary they may be engaged in intermittent activities initiated under eco-

development activities. They can be engaged as watchers and other management activities related to turtle nesting.

### **8.5 Village level site specific strategies**

- (i) No environmental conservation or management strategy is sound unless the needs, aspirations and livelihoods of people who depend on ecosystem resources and benefits are recognized and fully integrated. The effective management of ecosystem requires consideration not only of the biological and ecological parameters of the system but also the social and economic factors that condition their utilization by human societies.
- (ii) The people of the nearby villages could be involved in the management of the PA through appropriate eco-development processes. The measures among others would include formation of eco-development committees and providing alternate employment opportunities to local people mainly through tourism related activities.
- (iii) There are 6 villages abutting the boundary of the sanctuary namely Padmanabhapuram, Shivapuram, Betapur-1, Betapur-3, Dharmapur and Thiruvanchikulam. People of these two main villages in the vicinity of this sanctuary namely Padmanabhanpuram and Shivpuram can be actively involved in management of this sanctuary. Labour from these villages can be engaged in maintenance of the beach thereby generating employment opportunities. Some educated youths may be imparted training and engaged as tourist guides. Some may be encouraged to sell tender coconuts and other eatables to tourists without affecting the cleanliness of the beach/sanctuary. Youths may also be engaged temporarily for watch and ward along the boundary of the sanctuary. For each village, one eco-development committee would be constituted for proposing and finalizing the eco-development activities to be undertaken. Similarly based on the requirements of the people the department in coordination with the local P.R.I.body can identify & execute need based & suitable Entry Point Activities.
- (iv) The Range Officer concerned will initiate dialogue with the villagers for constituting the Eco-Development Committees. The proposal for constituting the EDC shall be approved by the Divisional Forest Officer (WL) Mayabunder.

## **8.6 Monitoring and evaluation**

The eco-development programme should be monitored regularly to get the desired success. The Monitoring and evaluation process will serve its purpose only when it is backed by follow up actions. Meanwhile the local people are imparted with required knowledge through capacity building programme so that they can ready to take charge of such eco-development programme.

# CHAPTER-9

## RESEARCH, MONITORING AND TRAINING

### 9.1 Research and monitoring

Research & Monitoring is very important for studying effectively the Nature, Natural resources & thereby ensuring effective management for conservation of wildlife & its habitats. Research & Monitoring is essential to study the impact of conservation measures undertaken over a period of time.

There is unlimited scope for carrying out research work in biologically rich and diverse tropical ecosystems in Andaman & Nicobar Islands. The sanctuary provides ample opportunities on research on turtle nesting and related fields. Three species of marine turtles namely Green Sea, Olive Ridley and Leatherback frequently visit this beach. The department is maintaining a good database of turtle nesting and this needs to be processed scientifically to get useful information. The staff needs to be trained in various modern methods of turtle tagging, satellite telemetry etc.

#### 9.1.1 Objectives

The objective of Research and Monitoring should include

- i) To create awareness of marine turtles conservation at local and regional level
- ii) To understand the post nesting migration & biology of Marine Turtles involving Tags/ satellite telemetry.
- iii) To identify the foraging grounds of Marine Turtles & linkages between nesting & feeding population.
- iv) To develop marine turtle conservation plan at regional level.
- v) To understand the nesting ecology of marine turtles at Cuthbert Bay wildlife sanctuary in a better way.
- vi) To study the fisheries practices adopted by the fishermen of Andamans and their interrelation with turtle mortality.
- vii) To undertake Research activity in vegetation, Mangroves, Littoral Forests etc.

## **9.1.2 Priority Research & Monitoring Areas:-**

### **9.1.2.1 Impact of Tsunami on Mangroves**

Tsunami has adversely affected the mangroves. At many places these are slowly showing signs of regeneration. However a scientific study is needed to assess the impact of tsunami on mangroves of this area. This will show whether tsunami has led to any change in the species composition of the mangroves. This is expected because it is observed that tsunami has led to uplifting of land in the northern parts of A & N Islands while in the southern part, the land has gone down. Therefore sea water level in the northern Islands has gone down. The species composition of mangroves in an area is dependent on the extent of salinity of the area and there is every possibility that the species composition might have changed and so also the regeneration of species. Scientific studies are needed to confirm this. This will further help in formulating appropriate strategies for eco-restoration of mangroves in degraded areas.

### **9.1.2.2 Survey and Monitoring of Marine Turtles**

All the four species of marine turtles found in the A & N Islands are included in Schedule I of the Wildlife (Protection) Act, 1972 and are considered endangered species. Their populations are dwindling and hence need for conservation. However, without having adequate data/information on their biology and behavior through research, it is difficult to frame appropriate management strategy. Intensive research often needs extensive infrastructure including expensive equipment for which sufficient budgetary provisions may not be available. However, simple monitoring programme can collect basic data on various aspects of their biology and provide good input for the management practices.

The nesting of important species of marine turtles in the sanctuary area makes it an ideal location for carrying out important research on marine turtle. Presently, the Department is recording details of turtle nesting. These details include date wise arrivals of turtle, time of arrival of each turtle, species and number of eggs laid in each nest etc. These eggs from the nest are then transferred to the hatcheries and the clutch is marked. From each clutch how many eggs hatch are also recorded. There is a good data base of information on turtle nesting at Division level.

**(A) (i) Collection of basic data**

The following basic data is collected from each turtle nesting site:

- (i) Daily record of species wise number of turtle visiting the sanctuary- both nesting and non-nesting turtles
- (ii) Date and Time of nesting
- (iii) Total number of nests laid,
- (iv) Clutch size of each nest -number of eggs laid in each nest,
- (v) Nest habitat- in grass, vegetation or sand,
- (vi) Nest location across beach- distance from mean high tide line
- (vii) Nest depth top- depth from surface to first egg
- (viii) Nest depth bottom- depth from surface to the bottom of the chamber
- (ix) Egg diameter- for 10 normal eggs
- (x) Egg Weight- for 10 normal eggs
- (xi) Fate of clutch- predated/collected/left in situ/relocated in hatchery

Excavation Data on nest contents can help in identifying problems during incubation either in the hatchery or *in-situ*.

**(A)(ii) Calculation of clutch size**

For calculation of Clutch size following data for the nest contents can be collected from the field:-

- (i) Shells (**S**)- number of hatched out empty shells
- (ii) Emerged (**E**)- Hatchlings that have emerged from the nest
- (iii) Live hatchlings still within the nest (**LIN**)
- (iv) Dead hatchlings within the nest (**DIN**)
- (v) Dead hatchlings in pipped (broken/ opened by the hatchling) egg (**DPE**)
- (vi) Live hatchling in pipped egg (**LPE**)
- (vii) Predated (**P**)- open, partial/nearly complete shell with egg residue/dead embryo

- (viii) Unhatched, undeveloped eggs with no obvious embryo (**UD**)
- (ix) Unhatched eggs with obvious small embryo (**UH**)
- (x) Unhatched full term embryo (**UHT**)

(Nest data sheet is given in **Annexure VII**)

Temperature, humidity and wind speed data of all the three existing hatcheries should also be collected on daily basis throughout the nesting season and till hatching is completed. This data is considered useful as sex ratio of turtle is considered to be affected by these parameters.

**Estimated Total Clutch**= components without shells + components with shells

**(Clutch size or CS)= (E+LIN+DIN) = (UD+UH+UHT+DPE+LPE) +P**

Where components without shells=number of hatched shells (S) = Emerged (E) =Live in Nest (LIN) = Dead in Nest (DIN)-the other components have shells.

If the total number of hatchlings emerged is not known (i.e., if a few escaped and were not counted), **E= S-(LIN+DIN)**.

**(A)(iii) Calculation of Hatching and emergence success**

If clutch size is determined by counting hatchlings, then

Emergence success (%) = **(E/CS) x 100**

Hatching success (%) = **(E+LIN+DIN) / CS) x 100**

If clutch size is determined by counting egg shells, then

Emergence success (%) = **(S-9LIN+DIN) / CS) x 100**

Hatching success (%) = **(S / CS) x 100**

Total clutch must include eggs that were lost between collection and relocation due to breakage or predation inside the hatchery.

**(B) Tagging of Marine Turtles**

Historically, sea turtle tagging has proved to be a valuable source of information on various aspects of sea turtle biology, growth, population sizes and migration. This involves marking animals either with metal tags or with PIT (Passive Internal Transponder) tags. Metal

tags are usually made of Titanium or metal alloys. PIT tags are small inert transponders sealed in glass which passively transmit a unique identification number to a handheld scanner or reader at a close range. The tags help in recognizing the turtles when they return to the same beaches to nest, hoping that others who encounter these animals in distant shores will return the tags or the information. The numbering must be unique to prevent confusion between tagging programme. The message on the tag must be concise. There are standard methods of providing tag numbers and messages.

Tagging is particularly useful to study turtles at the nesting beach. Tagging also provide information on time intervals between nesting and distance between nesting sites. It also helps in identifying migration routes and foraging grounds of turtles.

So far the Department has not started any tagging programme mainly due to lack of expertise in this area. Now a joint programme with Madras Crocodile Bank Trust on tagging of turtles along the coast of A & N Islands has been initiated and this sanctuary will be one of the sites. The proposal of tagging needs the approval of the Government of India.

### **(C)Radio telemetry and Satellite telemetry**

Telemetry is an advanced technique to study the migratory routes and behavior during the migration. Radio telemetry is a widely used technique and has been used with limited results to study turtles within the breeding area. This involves placing a transmitter on the turtle and tracking it with a receiver. However, once the turtle goes for a long journey, it is not possible to track the turtle. For tracking longer route, satellite telemetry is used.

Satellite telemetry is used for the purpose of tracing migratory route of turtle. Transmitters, also called PTTs (Platform transmitter terminals) are attached to the turtle. Once these devices are turned on, the transmitters send high frequency signals which are received by polar orbiting satellites.

The Department at present no expertise for this kind of research works. However, in future such advance techniques can be used in collaboration with expert organizations/ Institutes.

### **9.1.2.3 Census of Spotted Deer, Salt Water Crocodile and Herpetofaunal biodiversity**

Census of other important species like spotted deer, salt water crocodile, snakes etc may also be taken up and results of these censuses will help in evolving management

strategies for these species. Spotted deer is an introduced species. Plenty of food plants, availability of water and absence of its predator species has led to increase in its population and it is affecting the natural regeneration of many ecologically important species. Scientific study on the impact of spotted deer on the vegetation of this island would facilitate to evolve strategy to control its population.

#### 9.1.2.4 Survey of Butterflies

This would be done in collaboration with Zoological Survey of India (ZSI) who has their establishment at Port Blair.

#### 9.1.2.5 Action required during the Plan period

S.No.	Task	Agency	Time	Physical	Fund ( ` in lakhs per year)
1	Base line status surveys	SACON/IISc/ ZSI/WII/ FD	Two years	Entire Sanctuary	5.00
2	Census of various marine turtles.	SACON/IISc/ ZSI/WII/FD	Plan period	Entire Beach Area	4.00
3	Survey of exotic species & study of its impact on native.	ZSI/BSI/ FD	One year	Entire Sanctuary	2.50
4	Monitoring impact of biotic pressures on resources.	BSI/ZSI/FD	One year	Entire Sanctuary	4.00
5	Maintaining data base.	Forest Department(FD)	Two years	Entire Sanctuary	3.00
6	Developing monitoring protocol.	Forest Department(FD)	Plan Period	Entire Sanctuary	10.0

## 9.2 Training

1. Training programs in association with International agencies/ Universities for the park managers and research unit on advanced wildlife techniques and management skills.
2. Training for staff on wildlife rescue operations.
3. Training for field staff on basic first aid.

4. Advanced training for field staff on intelligence gathering, identifying wildlife articles, collection and handling of biological materials, identification of flora and fauna, census techniques, weapon handling, unarmed combat, wildlife acts, rules etc.
5. On-the-job training for the field staff to enhance cognitive development and skill based knowledge.
6. Forest Training School, Wimberlygunj shall serve as the training center for the field staff.

# CHAPTER-10

## ORGANISATION AND ADMINISTRATION

### 10.1 Structure and responsibilities

Presently the Cuthbert Bay Sanctuary is under the administrative control of the Divisional Forest Officer, Wildlife Division, Mayabunder. The Range officer, Wildlife Range, Tugapur is the in-charge of this sanctuary for management. The day to day works are looked after by a Forester assisted by Two Forest Guards and for carrying out different works there are five Mazdoors who are mainly involved in patrolling and maintenance of hatcheries.

During the nesting season a separate protection camp should be made functional near the Arguna area which should be headed by an officer not below the rank of a forester duly supported by at least 02 forest guards & 05workers. Apart from this camp another camp headed by a camp officer not below the rank of Deputy Ranger should be posted under the direct control of Range Officer who shall look after all the protection related works & also provide reinforcements on as & when required basis. The protection work should include regular patrolling, constant vigil on the boundary against prospective encroachers, along the beach for miscreants involved in illegal sand collection and poachers of marine resources.

Another camp officer not below the rank of a Forester may in addition be given Eco-tourism and eco-development related works.

It is felt that there should be a separate Range under the control of a Range Officer for the overall management of this Sanctuary. Also a Central Protection unit should be formed which shall function from the Range Office & the Range Officer himself shall be the over all In-charge of the C.P.U. The unit should be provided with a utility van for the transport of materials for developmental works and also for collection and transport of seized materials. The Range Officer and the camp officers may be provided with motor bikes and one or two speed boats with OBM or dinghies with inboard engines are also required to give an impetus to the protection efforts. Provision should be there for providing small fire arms to the Range Officer & the Camp officer for carrying out effective patrolling. The staff involved in the protection should be provided with all needed equipment like VHF hand held sets, GPS (Global Positioning System), arms etc.

A new Range office-cum-residence building has been constructed at Betapur. The building will house a full fledged Range Office which shall specifically look after the functioning of the Cuthbert Bay Wildlife Sanctuary. The building shall also house a Camp Office & an information centre for the tourists who shall be visiting the Cuthbert Bay Wildlife Sanctuary. The information center should display information on different kinds of marine turtles and also provide information on turtle nesting data of this sanctuary. Brochure and other publicity materials can also be distributed from this centre. Infrastructure setup in terms of new furniture & other display items, exhibits for the Information center needs to be developed for which sufficient fund needs to be earmarked.

## **10.2 Staff amenities**

Presently there are only two labour barracks which are constructed outside the sanctuary area. Presently the Executive staff posted in the Cuthbert Bay Wildlife Sanctuary have not been provided with any accommodation due to its non-availability. Most of the executive staff is residing in rented accommodation outside the Sanctuary. Also for maintaining the existing Buildings, labour barrack etc sufficient funds is required. In addition the staff need to be better equipped with GPS, night vision binocular etc. They should also be provided with tents and other camping equipment for camping at the site during the nesting season.

Providing accommodation to the family of protection staff close to places where basic education & other facilities are available. Two sets of Type- II twin sets quarters outside the sanctuary is very much essential for accommodating the staffs posted in the sanctuary. The existing labour barracks for the Labours need to be repaired. More buildings to accommodate executive staff and labours are required.

## **10.3 Capacity Building**

One of the major constraint in effective management of most the PAs in A & N Islands is lack of trained staff. This sanctuary is no exception. Maintenance of turtle nesting habitat, relocation of eggs to hatcheries and their maintenance, collection and maintenance of nesting data etc are all specialized works and need trained staff. It is therefore necessary that adequate steps be taken for the training of sanctuary staff and they should not be transferred unless trained staff replaces them. The Department can request the Government of India, Wildlife Institute of India, Dehradun, Odisha Forest Department, Madras Crocodile Bank

Trust etc other Scientific & Research Institutes for conducting short term training programmes for the staff engaged in turtle nesting related works.

#### **10.4 Staff Posting**

For ensuring effective implementation of all the conservation & protection plan one of the major requisites is sufficient staff & labour strength. The present staff & labour strength of the Sanctuary is highly inadequate & the same needs to be strengthened. The following staff & labours would be essentially required exclusively for the management of the Sanctuary:-

- a) Forester - 02 Nos.
- b) Head Forest Guard - 01 No.
- c) Forest Guard - 02 Nos.
- d) Regular Mazdoor - 04 Nos.

# CHAPTER-11

## 11 THE BUDGET OUTLAY

### 11.1 Budget outlay for Cuthbert Bay Sanctuary from 2013-2023

Protection Plan		(Rs. In lakh)																				
Sl.	Item of Works	Year 2013-23																				Total
		2013-14		2014-15		2015-16		2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
<b>A.</b>	<b>Non Recurring</b>																					
1.	Procurement of utility van (1 Nos.)	1	7.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.00
2.	Procurement of fibre boat with 40 hp OBM engine (1 No.)	1	7.00	-	-	-	-	-	-	-	-	1	8.50	-	-	-	-	-	-	-	-	15.50
3.	Procurement of motor bikes	1	0.65	2	1.30	-	-	-	-	-	-	1	0.75	-	-	1	0.80	-	-	-	-	3.50
4.	Procurement of engine dinghies with inboard engines	1	2.50	-	-	-	-	-	-	-	-	1	3.00	-	-	-	-	-	-	-	-	5.50
5.	Procurement of tents and camping equipments	LS	2.00	-	-	LS	2.00	-	-	-	-	LS	2.00									6.00
	<b>Total</b>	-	<b>19.15</b>	-	<b>1.30</b>	-	<b>2.00</b>	-	-	-	-	-	<b>14.25</b>	-	-	-	<b>0.80</b>	-	-	-	-	<b>37.50</b>
<b>B.</b>	<b>Recurring</b>																					
1.	Patrolling in land and sea	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	20.00

<b>2.</b>	Procurement of Arms and other equipments ®	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	20.00
<b>3.</b>	Boundary Demarcation/clearance of Cuthbert Bay (WL) Sanctuary	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	12.50
<b>4.</b>	Repair & maintenance of water craft/Vehicles	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	15.00
	<b>Total</b>	-	<b>6.50</b>	-	<b>6.50</b>	-	<b>6.50</b>	-	<b>6.50</b>	-	<b>6.50</b>	-	<b>7.00</b>	-	<b>7.00</b>	-	<b>7.00</b>	-	<b>7.00</b>	-	<b>7.00</b>	<b>67.50</b>
	<b>Total (A+B)</b>	-	<b>25.65</b>	-	<b>7.80</b>	-	<b>8.50</b>	-	<b>6.50</b>	-	<b>6.50</b>	-	<b>21.25</b>	-	<b>7.00</b>	-	<b>7.80</b>	-	<b>7.00</b>	-	<b>7.00</b>	<b>105.00</b>

## II. Turtle Nesting Conservation Plan

<b>A. Recurring</b>																						
<b>1.</b>	Improvement of the nesting sites of Sea turtles as a part of eco-restoration, including removal of Casuarina at Cuthbert Bay (WL) Sanctuary	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.20	LS	1.20	LS	1.20	LS	1.20	LS	1.20	<b>11.00</b>
<b>2.</b>	Maintenance of nesting beach areas including regular removal of garbage deposited due to due to tidal and wave actions at Cuthbert Bay (WL) Sanctuary.	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.20	LS	2.20	LS	2.20	LS	2.20	LS	2.20	<b>21.00</b>
<b>3.</b>	Protection turtle nesting areas during nesting season by providing round the clock watch &	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.20	LS	2.20	LS	2.20	LS	2.20	LS	2.20	<b>21.00</b>

	ward at Cuthbert Bay (WL) Sanctuary																					
4	Studies on Ex-situ conservation including maintenance of hatcheries at Cuthbert Bay (WL) Sanctuary	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.50	LS	1.70	LS	1.70	LS	1.70	LS	1.70	LS	1.70	<b>16.00</b>
	<b>Total</b>		<b>6.50</b>		<b>6.50</b>		<b>6.50</b>		<b>6.50</b>		<b>6.50</b>		<b>7.30</b>		<b>7.30</b>		<b>7.30</b>		<b>7.30</b>		<b>7.30</b>	<b>69.00</b>
<b>B</b>	<b>Non Recurring</b>																					
1.	Construction of new semi permanent hatchery	1	3.00	-	-	-	-	-	-	-	-	1	3.50	-	-	-	-	-	-	-	-	<b>6.50</b>
	<b>Total</b>		<b>3.00</b>	-	-	-	-	-	-	-	-		<b>3.50</b>	-	-	-	-	-	-	-	-	<b>6.50</b>
	<b>Total (A+B)</b>		<b>9.50</b>		<b>6.50</b>		<b>6.50</b>		<b>6.50</b>		<b>6.50</b>		<b>10.80</b>		<b>7.30</b>		<b>7.30</b>		<b>7.30</b>		<b>7.30</b>	<b>75.50</b>
<b>III. Nature Education, Eco-Tourism and Eco-development Plan</b>																						
<b>A.</b>	<b>Recurring</b>																					
1.	Maintenance of Nature Trail	LS	0.50	LS	0.50	LS	0.50	LS	0.50	LS	0.50	LS	0.55	LS	0.55	LS	0.55	LS	0.55	LS	0.55	<b>5.25</b>
2.	Organizing Nature Camps	4	1.00	4	1.00	4	1.00	4	1.00	4	1.00	4	1.20	4 Nos.	1.20	4	1.20	4	1.20	4No	1.20	<b>11.00</b>
3.	Fabrication and display of signages/ Advertisement boards	LS.	1.00	LS.	1.00	LS.	1.00	LS.	1.00	LS.	1.00	LS.	1.10	LS.	1.10	LS.	1.10	LS.	1.10	LS.	1.10	<b>10.50</b>
4.	Development and maintenance of facilities for tourists like resting sheds etc	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	<b>20.00</b>
5.	Publication of brochure, booklets, posters etc	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	L.S.	1.50	<b>15.00</b>
	<b>Total</b>		<b>6.00</b>		<b>6.00</b>		<b>6.00</b>		<b>6.00</b>		<b>6.00</b>		<b>6.35</b>		<b>6.35</b>		<b>6.35</b>		<b>6.35</b>		<b>6.35</b>	<b>61.75</b>

<b>B. Non- recurring</b>																							
1.	Development of Newly constructed Information Centre & its maintenance.	LS	5.00	-	-	LS	3.00	-	-	LS	2.00	-	-	LS	1.00	-	-	LS	0.50	LS	0.50	12.00	
	<b>Total</b>		<b>5.00</b>		<b>-</b>		<b>3.00</b>		<b>-</b>		<b>2.00</b>				<b>1.00</b>				<b>0.50</b>		<b>0.50</b>	<b>12.00</b>	
	<b>Total (A+B)</b>		<b>11.00</b>		<b>6.00</b>		<b>9.00</b>		<b>6.00</b>		<b>8.00</b>		<b>6.35</b>		<b>7.35</b>		<b>6.35</b>		<b>6.85</b>		<b>6.85</b>	<b>73.75</b>	
<b>IV. Research, Survey and Monitoring</b>																							
A	Establishment of Database Centre (Procurement of Hardware & Software)	LS	2.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	11.00	
2.	Procurement of Research Equipment	LS	2.00	LS	2.00	LS	2.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	13.00	
3.	Procurement of survey equipment like GPS	LS	2.00	LS	2.00	LS	2.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	LS	1.00	13.00	
			<b>6.00</b>		<b>5.00</b>		<b>5.00</b>		<b>-</b>		<b>3.00</b>		<b>3.00</b>		<b>3.00</b>		<b>3.00</b>		<b>3.00</b>		<b>3.00</b>	<b>37.00</b>	
1.	Survey & Monitoring of Sea turtle nesting at CBBay (WL) Sanctuary	LS	1.00	LS	1.00	LS	1.00	L	1.00	LS	1.00	LS	1.20	LS	1.20	LS	1.20	LS	1.20	LS	1.20	11.00	
2.	Tagging programme with Madras Crocodile Trust	LS	4.00	-	-	LS	4.00	-	-	LS	4.00	-	-	LS	4.00	-	-	LS	4.00	-	-	20.00	
	<b>Total</b>		<b>5.00</b>		<b>1.00</b>		<b>5.00</b>		<b>1.00</b>		<b>5.00</b>		<b>1.20</b>		<b>5.20</b>		<b>1.20</b>		<b>5.20</b>		<b>1.20</b>	<b>31.00</b>	
	<b>Total (A+B)</b>		<b>11.00</b>		<b>6.00</b>		<b>10.00</b>		<b>4.00</b>		<b>8.00</b>		<b>4.20</b>		<b>8.20</b>		<b>4.20</b>		<b>8.20</b>		<b>4.20</b>	<b>68.00</b>	
<b>V. Infrastructure Development and Capacity Building</b>																							
<b>A Non Recurring</b>																							
1.	Construction of Type –II twin set staff accommodation	1	20.00	--	-	-	-	1	25.00	-	-	-	-	-	-	-	-	-	-	-	-	45.00	

<b>2.</b>	Construction of labour Barrack			1 no	20.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00
	<b>Total</b>		<b>20.00</b>	-	<b>20.00</b>	-	-	-	<b>25.00</b>	-	-	-	-	-	-	-	-	-	-	-	-	<b>65.00</b>
<b>B</b>	<b>Recurring</b>																					
<b>3.</b>	Maintenance of existing Infrastructure	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.00	LS	2.50	LS	2.50	L	2.50	LS	2.50	LS	2.50	22.50
<b>4.</b>	Training of executive staff	L.S.	2.00	-	-	L.S.	2.00	-	-	L.S.	2.00	-	-	L.S.	2.00	-	-	L.	2.00	-	-	10.00
	<b>Total</b>		<b>4.00</b>		<b>2.00</b>		<b>4.00</b>		<b>2.00</b>		<b>4.00</b>		<b>2.50</b>		<b>4.50</b>		<b>2.50</b>		<b>4.50</b>		<b>2.50</b>	<b>32.50</b>
	<b>Total(A+B)</b>		<b>24.00</b>		<b>22.00</b>		<b>4.00</b>		<b>27.00</b>		<b>4.00</b>		<b>2.50</b>		<b>4.50</b>		<b>2.50</b>		<b>4.50</b>		<b>2.50</b>	<b>97.50</b>
	<b>Grand Total</b>		<b>81.15</b>		<b>48.30</b>		<b>38.0</b>		<b>50.0</b>		<b>33.0</b>		<b>45.1</b>		<b>34.35</b>		<b>28.15</b>		<b>33.85</b>		<b>27.85</b>	<b>419.75</b>

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81-no. 30

24/4/97

C/S



अण्डमान तथा



निकोबार राजपत्र

Andaman And

Nicobar Gazette

असाधारण  
EXTRAORDINARY

प्राधिकार से प्रकाशित  
Published By Authority

धं. 64, पोर्ट ब्लेयर, गुवाहाटी, वृत्त 24, 1997  
No. 64, Port Blair, Thursday, April 24, 1997

ANDAMAN AND NICOBAR ADMINISTRATION  
SECRETARIAT

NOTIFICATION

Port Blair, dated the 24th April, 1997.

No. 62/97/F. No. CWLW/WL/3/130.—Whereas the Wildlife Advisory Board, Andaman and Nicobar Islands has recommended to declare Wildlife Sanctuary in "CUTHBERT BAY" for protection and propagation of Olive Ridley Turtle.

And whereas the Lieutenant Governor (Administrator), Andaman and Nicobar Islands considers that the aforesaid areas, which are either Protected Forests or Reserve Forests under the Indian Forest Act, 1927 (Act 16 of 1927), and having adequate ecological, faunal, floral, geomorphological, natural and zoological significance for the purpose of protecting, propagating and developing wildlife and its environment for the respective purpose indicated above;

Now, therefore, in exercise of the powers conferred by proviso to clause (b) of sub-section (1) of section 26-A of the Wildlife (Protection) Act, 1972 (Act 53 of 1972) read with clause (29) of Section 2 thereof, the Lieutenant Governor (Administrator), Andaman and Nicobar Islands is pleased to declare that the aforesaid Protected Forest area, the situation and limits of which are specified in the schedule given below, shall be a Sanctuary for the purpose as aforesaid, from the date of issue of this Notification in the Official Gazette:—

SCHEDULE

CUTHBERT BAY SANCTUARY:—

The Protected Forest area situated in between 92° 57'10" and 92°59" East longitude and 12°37'20" to 12°43" North latitude. The boundary starts from a Point 'A' in Betapur Nallah and runs north west along the coast to Point 'B' at 600 Mt. from high tide mark in the west and meets at a point 'C' in Cape Strachen. The Eastern boundary start from Point 'A' marked in the Betapur Nallah running north along the coast from the high tide water of East Coast till it meets point 'C' in Cape Strachen.

(ISHWARI PRASAD GUPTA),  
Lieutenant Governor.

By order and in the name of the Lieutenant Governor.

(TARUN COOMAR),  
Deputy Secretary (EGF),  
Andaman and Nicobar Administration.

**ANDAMAN AND NICOBAR GAZETTEE**

**EXTRAORDINARY**

Published By Authority

Port Blair, the 8<sup>th</sup> September, 1963/12<sup>th</sup> Bhadra 1885.

**ANDAMAN AND NICOBAR ADMINISTRATION**  
Chief Commissioner's Secretariat

**NOTIFICATION**

Port Blair, the 8<sup>th</sup> September, 1963/12<sup>th</sup> Bhadra 1885.

No. 115/47-5/60-DH.- WHEREAS the forest land described in the Schedule below are not included in any reserved forests;

AND WHEREAS the Assistant Commissioner (Settlement) Port Blair was directed by the Chief Commissioner, Andaman and Nicobar Islands, to make a formal inquiry into and record the nature and extent of the rights of Government and of private persons in or over the said forest lands as required by Sub-Section (3) of section 29 of the Indian Forest Act, 1927, and the said officer has after making the inquiry recorded that no Private person has any kind of rights in or over the said forest lands and that the said forest lands are the property of Government;

NOW, therefore, in exercise of the powers conferred by sub-sections (1) and (2) of Section 29 of the said Act read with the Government of India, Ministry of Home Affairs Notification No. 69/49/50-AN dated the 7<sup>th</sup> November, 1951 the Chief Commissioner, Andaman and Nicobar Islands has been pleased to declare the said forest lands to be protected forests to which the provisions of Chapter IV of the said Act shall apply with effect from the date of publication of this notification in the Gazette.

**SCHEDULE**

**I. NORTH ANDAMAN PROTECTED FOREST:-**

This protected forest includes:-

- (1) The entire area of the following Islands:-

S.No	Name of the Islands	S.No	Name of the Islands
1	Channel	12	Shearme
2	Landfall	13	Sugar Loaf
3	East	14	Jub Jub
4	Pecock	15	Rowe
5	West	16	Snark
6	Whit Cliff	17	Kwang Tung
7	Thorn Hill	18	Latonche
8	Reef	19	North Reef
9	Mayo	20	Interview
10	Paget	21	Boudeville

11	Point	22	Sea Serpent
23	Snake	40	Craggy
24	Buchanan	41	Bamboo
25	Tree	42	Blister
26	Excelsior [Table Island Group]	43	Curlew
27	Delgarno	44	Goose
28	Tribby	45	Gandel
29	Temple	46	Stewart
30	Turtle	47	Dot
31	Narcondom	48	Oyster
32	Jungle	49	Oliver
33	North	50	Sound
34	Wharf	51	Orchid
35	South	52	Grulew [Island barkely Group]
36	Ox	53	Swamp
37	Chatham	54	Dottrel
38	Brush	55	Egg
39	Ross	56	Aves

P.□. The area under North Andaman main island excluding the area of the following 28 ages.

1	Shyam Nagar	15	Keralapur
2	Radha Nagar	16	Durgapur
3	Swaraj Gram	17	Shisipur
4	Milan Gram	18	Kalipur
5	Lakshampur	19	Kishorinagar
6	Madhupur	20	Paranghata
7	Krishnapuri	21	Navagram
8	Rajedrapalli	22	Nichintapur
9	Deshabandugram	23	Kalighat
10	Subhas Gram	24	Madhyamgram
11	Sita Nagar	25	Jagannath Dera
12	Kudhirampur	26	Ram Nagar
13	Ram Krishnagram	27	Mohanpur
14	Vidyasagaripalli	28	Aerial Bay

P.□. The area under Smith Island excluding the area of village Sagar Dwip.

#### MIDDLE ANDAMAN PROTECTED FOREST:

This protected forest includes:-

(1) The entire area of the following islands:-

S.No.	Name of the Islands	S.No.	Name of the Islands
1	Entrance	6	Bennett
2	Surat	7	South Reef
3	Speke	8	Anderson

4	Ranger	9	Mask
5	Roper	10	Tuft
11	Homp	17	Porlob
12	Flat	18	Guitar
13	Gurjan	19	Round
14	Parkinson	20	Barren
15	Oyster	21	Chengappa
16	Cone		

P.□. The area under Middle Andaman main island excluding the area of the following 44 villages:-

1	Nimbutala	23	Urmilapur
2	Amkunj	24	Kalsi
3	Panchavati	25	Bangaon
4	Padmanabhpuram	26	Syamkund
5	Sivpuram	27	Kadamtala
6	Tiruvanchikkulam	28	Uttara
7	Ramchandra nagar	29	Santhanu
8	Dharampur	30	Koshalya nagar
9	Santhipur	31	Shaktigarh
10	Swadeshnagar	32	Mayabunder
11	Rangat	33	Pokha Dera
12	Janakpur	34	Danapur
13	Dasharatpur	35	Rampur
14	Sabari	36	Lucknow
15	Sitapur	37	Latau
16	Mithila	38	Devpur
17	Rampur	39	Webi
18	Parnasala	40	Paheigaon
19	Bharatpur	41	Hanspuri
20	Vishnupur	42	Chainpuri
21	Bakultala	43	Pudi adirao
22	Lakshmanpur	44	Tugapur

(3) The area under Long Island excluding the area of the village Long Island

By Order

P. V. APRAIM  
Asst. Secretary to the Chief Commissioner  
Andaman and Nicobar Islands.

## ANDAMAN AND NICOBAR GAZETTEE

## EXTRAORDINARY

Published By Authority

Port Blair, the 15<sup>th</sup> March, 1971/24<sup>th</sup> Phalguna 1892.ANDAMAN AND NICOBAR ADMINISTRATION  
Chief Commissioner's SecretariatPort Blair, the 15<sup>th</sup> March, 1971/24<sup>th</sup> Phalguna 1892.

## NOTIFICATION

No. G/635-3.- In exercise of the powers conferred by clause (a) of the sub-section -I of section 4 of the Indian Forest Act, 1927 (Act XVI of 1927), the Chief Commissioner, Andaman and Nicobar Islands is the areas specified in the Schedule below in the North and Middle Andamans as Reserved Forests and under clause (c) of the said Sub-section to appoint Shri Lachman Singh, Assistant Commissioner, Mayabunder of the Forest Settlement Officer to enquire into and determine the existence, nature and extent of any rights alleged to exist in favour of any person in or over any land comprised within such limits, or in or over any forest produce and to deal with the same as provided in Chapter II of the said Act.

## I. NORTH ANDAMAN RESERVE:-

This includes:-

(1) The entire area comprised in the following Islands:-

S.No.	Name of the Islands	S.No.	Name of the Islands
1	Channel	21	Boudeville
2	Landfall	22	Sea Serpent
3	East	23	Snake
4	Pecock	24	Buchanan
5	West	25	Tree
6	Whit Cliff	26	Excelsior [Table Island Group]
7	Thorn Hill	27	Delgarno
8	Reef	28	Tribby
9	Mayo	29	Temple
10	Paget	30	Turtle
11	Point	31	Narcondom
12	Shearme	32	Jungle
13	Sugar Loaf	33	North
14	Jub Jub	34	Wharf
15	Rowe	35	South
16	Snark	36	Ox
17	Kwang Tung	37	Chatham
18	Latonche	38	Brush
19	North Reef	39	Ross
20	Interview	40	Graggy

41	Bamboo	49	Oliver
42	Blister	50	Sound
43	Curlew	51	Orchid
44	Goose	52	Grulew [Island barkely Group]
45	Gandel	53	Swamp
46	Stewart	54	Dottrel
47	Dot	55	Egg
48	Oyster	56	Smith

- (2) The area under North Andaman main island excluding the area of the following 29 villages.

1	Shyam Nagar	15	Keralapur
2	Radha Nagar	16	Durgapur
3	Swaraj Gram	17	Shibpur
4	Milan Gram	18	Kalipur
5	Lakshmipur	19	Kishorinagar
6	Madhupur	20	Paranghara
7	Krishnapuri	21	Navagram
8	Rajedrapalli	22	Nichintapur
9	Deshabandugram	23	Kalighat
10	Subhas Gram	24	Madhyamgram
11	Sita Nagar	25	Jagannath Dera
12	Kudhirampur	26	Ram Nagar
13	Ram Krishnagram	27	Mohanpur
14	Vidyasagaripalli	28	Aerial Bay
		29	Sagar Dweep

#### MIDDLE ANDAMAN RESERVE:

This includes:-

- (i) The entire area COMPRISED IN the following islands:-

S.No.	Name of the Islands	S.No.	Name of the Islands
1	Entrance	12	Flat
2	Surat	13	Gurjan
3	Speke	14	Parkinson
4	Ranger	15	Oyster
5	Roper	16	Cone
6	Bennett	17	Porlob
7	South Reef	18	Guitar
8	Anderson	19	Round
9	Mask	20	Barren
10	Tuft	21	Chengappa
11	Homp		

- (ii) The area under Middle Andaman main island excluding the area of the following 44 villages:-

1	Nimbutala	23	Urmilapur
2	Amkunj	24	Kalsi
3	Panchavati	25	Bangaon
4	Padmanabhpuram	26	Syamkund
5	Sivpuram	27	Kadamtala
6	Tiruvanchikkulam	28	Uttara
7	Ramchandra nagar	29	Santhanu
8	Dharampur	30	Koshalya nagar
9	Santhipur	31	Shaktigarh
10	Swadeshnagar	32	Mayabunder
11	Rangat	33	Pokha Dera
12	Janakpur	34	Danapur
13	Dasharatpur	35	Rampur
14	Sabari	36	Lucknow
15	Sitapur	37	Latau
16	Mithila	38	Devpur
17	Rampur	39	Webi
18	Parnasala	40	Pahelgaon
19	Bharatpur	41	Hanspuri
20	Vishnupur	42	Chainpuri
21	Bakultala	43	Pudimadurai
22	Lakshmanpur	44	Tugapur

(iii) The area comprised in the Long Island excluding the area of the village Long Island.

H.S. BUTALIA,  
Chief Commissioner,  
By Order and in the Name of the Chief Commissioner

BACHAN SINGH,  
Forest Secretary,  
Andaman and Nicobar Administration.

Map Showing important points within Cuthbert Bay wildlife sanctuary



अण्डमान तथा  
Andaman And



निकोबार राजपत्र  
Nicobar Gazette

EXTRAORDINARY

प्राधिकार से प्रकाशित  
Published by Authority

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सं. 179, पोर्ट ब्लेयर, सोमवार, 8 अगस्त, 2011  
No. 179, Port Blair, Monday, August 8, 2011

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Andaman & Nicobar Administration  
(Department of Environment & Forests)

**NOTIFICATION**

173/2011 No. CWLW/WL/170/212

Port Blair, dated 8<sup>th</sup> August, 2011

**RESOLUTION FOR FORMATION AND WORKING OF  
ECO-DEVELOPMENT COMMITTEES IN  
ANDAMAN AND NICOBAR ISLANDS**

Whereas, the Department of Environment and Forests has taken up a massive programme of wildlife conservation and management in the Andaman and Nicobar Islands and established a number of wildlife Protected Areas, i.e. Sanctuaries and National Parks, for this purpose.

Whereas, the National Wildlife Action Plan (1983) emphasises the need for developing appropriate management systems for protected areas, with due regard to the needs of local people for ensuring their support and involvement in conservation and protection.

Whereas, Andaman and Nicobar Administration vide Notification No. 82/05/F.No. (G-I)/37/133 dated 20/5/2005 exhorted for involving villagers residing in the vicinity of the forests in protection and management of forest areas.

Whereas, to reduce the negative impacts of local people on bio-diversity as well as negative impacts of Protected Area on livelihood of local people and to increase opportunities for local participation in Protected Area management, the Lieutenant Governor, Andaman and Nicobar Islands is pleased to decide that Eco-Development Committee (EDC) shall be constituted for the purpose of protection and development of wildlife Protected Areas (Sanctuaries and National Parks) subject to observance of the conditions provided in this Resolution.

The composition, duties and functions, the usufructory benefits and restrictive measures pertaining to such committees shall be as follows:-

**I. ECO-DEVELOPMENT COMMITTEE (EDC):**

**A. CONSTITUTION:-**

1. A village meeting will be convened in the target villages by an officer not below the rank of Forest Range Officer.
2. The quorum for the meeting shall be one adult member each from atleast 50% of the households in the villages thus represented.
3. In the meeting, the Concept of Eco-development will be explained by the Convenor (Forest Range Officer). He shall hold series of participatory meetings with the community as well as separate meetings with women groups and deprived sections. After taking the views of the community and with their concurrence eco-development committee shall be formed within the frame work of guidelines issued herein. Such (EDC) shall be recognised by the concerned Divisional Forests Officer/ Deputy Conservator of Forests of the Protected Area.
4. Eco-Development Committee will be constituted with two adult representatives from each household out of whom atleast one should be a woman. Also care is to be taken to represent ST community in the EDC.

**B. FUNCTIONS:-**

1. The Eco-Development Committee shall maintain a register showing the details of the members. The members may file declaration form containing the details like name, Father/Spouse name, age, address etc. as in Appendix-A.
2. The Eco-Development Committee shall maintain a minutes book and record the proceedings of the meetings of the Executive Committee held from time to time.
3. The meeting of Eco-Development Committee be held atleast once in two months to review the developmental activities.
4. Under special circumstances (1/3)rd of the Eco-Development Committee members can requisition an emergency meeting of the general body of EDC through Forest Range Officer concerned.
5. Every EDC will have an account in a Bank / Post Office into which funds meant for EDC shall be deposited. The account shall be operated jointly by the Chairperson and Member Secretary of the Committee. The details shall be placed before the EDC for approval.
6. The members of the EDC's shall individually and collectively ensure protection of the Forests / Wild Life of the Protected Area.

7. The members of EDC to assist the Forest Staff in apprehending persons committing Forest/ Wild Life offence like encroachments, poaching, felling of trees, grazing and fires etc., in consonance with the provisions of Wild Life (Protection) Act, 1972, Indian Forest Act, 1927 and Forest (Conservation) Act, 1980.
8. The EDC will help in the timely execution of the all eco-restoration works taken up in the EDC's area including mobilisation of work force.
9. The member of EDC shall report to the authorities concerned of Protected Areas about illegal activities of any particular member, which are found prejudicial or detrimental to the interests of Forests/ Wild Life.
10. The members of EDC to guard against misuse of funds provided for eco-development.

## **II. EXECUTIVE COMMITTEE (EC):**

### **A. CONSTITUTION:**

1. Ten elected representatives from the eco-development committee of which atleast 30% shall be women members shall form the Executive Committee.
2. Patwari/VLW/Panchayat Member/Pradhan/Teacher as a member.
3. Representative of NGOs.
4. Concerned Forest Guard of Forest Division & Wildlife Division as member.
5. Forest Range Officer as Member Secretary.
6. The Forest Range Officer shall act a returning officer for election of members of Executive Committee. The term of the Executive Committee shall be 2 years. Minimum (2/3)rd majority of General Body should approve change of Executive Committee or Chairperson.
7. The Executive Committee shall elect its Chairperson from its members whose term shall be co-terminus with the term of Executive Committee.
8. The quorum for committee shall not be less than half of the strength of Executive Committee.
9. Non elected members will have no voting rights.
10. The Member Secretary shall be the Convenor of the Executive Committee.

### **III. FUNCTIONS:**

1. The Executive Committee shall meet at least once in a month.
2. The Member Secretary shall convene the Executive Committee meetings and maintain the record of the proceedings. The copy of the proceedings shall be sent to the Forest Range Officer. The Executive Committee shall not take up any activity which is contrary to the approved eco-development plan or relevant acts and rules.

3. If any member of the EDC indulges in acts against Forest and Wild Life or approved eco-development plan, such member shall be terminated from the EDC by the Executive Committee.
4. The Executive Committee shall implement the action plan by assigning duties and responsibilities to the members of EDC to ensure protection of Forests and Wild Life under its charge. The members of EDC shall have preference for wage employment in eco-development works.
5. The joint account will be operated by the Chairperson and Member Secretary as per the written resolutions of Executive Committee.

**IV. FUNCTIONS AND RESPONSIBILITIES OF PROTECTED AREA MANAGEMENT:**

The Protected Area Management (PAM) shall provide assistance to the eco-development committee.

1. In selection and demarcation of area allotted for protection.
2. In conducting PRA and preparation of Micro Plan and its implementation.
3. In transferring the skills of sound Habitat /Wild Life Management practices to the members of the EDCs.
4. In convening meetings of Member Secretaries and Chairpersons of the EDCs in Protected Area once in six months.
5. If a Committee fails to function properly or if there any instances of financial irregularities or any violations of rules and regulations stipulated therein the concerned DCF/DFO will dissolve Executive Committee after due enquiry.

**V. MICRO PLANNING :**

A Micro Plan incorporating Eco-development activities within the frame work of approved Management Plan will be drawn up in a participatory manner prior to commencements of activities. For the purpose of Micro planning, the EDC members, the park management and NGOs, if available, shall thoroughly perambulate the EDC area. PRA or PANIA exercise will be carried out keeping in view of the needs of the people on one hand and of conservation of Bio-diversity on the other to draft the micro plan. The micro plan shall aim at making the EDC free from dependencies on the PA by the end of the funding provided by Govt. or other external sources. The micro plan also prescribe measures to be taken to make the Eco-Development Committee self sustainable to carry on the programme even after the end of the project.

The micro plans should clearly spell out the various impacts like social, technical, ecological and financial in respect of each of the proposed activity for effective implementation.

The micro plan prepared shall be placed before the EDC subsequently.

The micro plan shall be signed by the Forest Range Officer on behalf of the Park management and by Chairperson on behalf of the EDC as mark of mutual consent regarding selection of activities. Habitat Improvement Operations in PA's will be identified by the PA Management in consultation with EDC members and they will be clearly mentioned in micro plan as approved by CWLW or Officer authorised by him.

A MoU shall be entered into between Protected Area Management and EDC clearly mentioning the reciprocal commitments.

#### **VI. ECO- RESTORATION:**

The Deputy Conservator of Forests/Divisional Forests Officer will decide the suitability of the operation for habitat improvement in his Protected Area. The Deputy Conservator of Forests/Divisional Forests Officer may choose any operation in consultation with the EDC members in consonance with management plan directions and other rules/ regulations in force.

#### **VII. INVESTMENT PLANS:**

- A. People, who are dependent upon the PA's who were denied accessibility to the resources, are to be compensated for their loss of opportunity to the PA resources, which they were enjoying before the formation of PA.
- B. Village oriented activities like physical construction and fuel and fodder plantations are also to be included in the investment plan.
- C. The individual and village oriented works should be in the ratio of 50:50.

#### **A) Programmes to benefit individual/people:**

1. Providing individual households with suitable tools and implements to practice their traditional professions and also to provide alternate income generation schemes, wherever their existing professions are not remunerative.
2. The tools and kits to rural artisan to practice their profession like Fishing nets, Cobbler kits, Carpenter tools, Pottery tools, Sewing machines etc. fall in this category.
3. Introducing and improving alternate programmes like Apiculture, Horticulture, Pisciculture, Mushroom cultivation to provide additional income during non-agricultural season.
4. Encouraging group activities like basket making, garment making, sewing, printing, painting on clothes, leaf plate making, rope making, poultry, piggery, inland fishing, value added processing units, vegetable vending etc.

**B) Village Oriented Programmes:**

1. Development of Village Wood lots and Pasture plots outside Protected Areas.
2. Deepening of existing tanks and construction of check dams outside Protected Areas to provide water to the Village cattle.
3. Improvement and creation of tanks outside Protected Areas to increase yields from their existing agricultural fields.
4. Providing of drinking water sources to the Village community.

**C) Eligibility Criteria for Village Eco-Development Investment:**

Families dependent on the Forest resources of Protected Areas should form the main target group under the Eco-development programme. Care should be taken to ensure that the investment should be activity oriented. And in respect of each activity cost contribution should be spelled out in the micro plan. In case of individual household the cost recovery with repayment schedule should be worked out with phasing of interventions.

**VIII. PROVIDING OF ALTERNATE ENERGY SOURCES:**

This Programme aims to reduce the pressure on Protected Areas for fuel wood, by adopting the following measures in collaborations with NRSE Division of APWD.

1. Providing fuel efficient chulhas to every household in the EDC village.
2. Providing Bio-gas plants to household having 4 to 5 cattle.
3. Supplying Solar Cookers on request.

**IX. CREATION OF REVOLVING FUND:**

For sustaining the eco-development programme even after the end of the external/government funding a revolving fund be created in each eco-development village to help in continuation of the programme. The revolving fund is to be set up from the following sources.

1. Individual beneficiaries to contribute not less than 25% of the cost of the asset provided to him towards the revolving fund, but wherever tribal groups are there this condition need not be insisted.
2. The value of the labour input by the members of the EDC by way of Shramdan in the community work should add towards revolving fund.
3. Thrift groups are to be encouraged under social banking.

**X. ROLE OF N.G.Os:**

For any Governmental programme involving interest of the people to succeed, the Non-Governmental Organisation have an important role to play. The NGOs can act as facilitators between the Government and the people. The Eco-development programme is one such programme where the NGOs can play a meaningful role as enumerated below:

1. Help the process of development of proper understanding between PA management and the community for propagation of the principles of Bio Diversity Conservation.
2. Help in preparation of a Micro-plan for the EDC.
3. Help in introduction of relevant environment - friendly technology in the village in improve the skills of the local people.
4. Help in mobilisation of resources from other developmental agencies.
5. Help in propagating the concept of thrift, credit and social banking.
6. Help in conducting training of local communities for capacity building, leadership skills, gender sensitisation.
7. Help in continuous monitoring of EDC activities including monitoring of assets provided under the programme.
8. Help in conducting baseline survey in all EDC villages, sample indicators of Socio- economic condition of the target people.

**XI. N.G.O. SUPPORT:**

Each individual NGO is expected to associate in atleast 2-3 EDCs. They shall take up work of motivation, preparation of micro plan, gender sensitisation, monitoring of Eco-development programmes, organising thrift, credit and revolving fund. MoU is to be entered into between NGO and Park management defining the role and financial commitments.

**XII. ECO TOURISM:**

In each Protected Area tourism zone will be identified which will be used for receiving tourists on limited scale.

In this zone, Eco-friendly amenities will be erected for tourists. For conducting tourists, local youth / EDC members will be trained as tourist guides. The Revenue from tourism will be ploughed back to Protected Area for development.

**XIII. TRAINING:**

1. Trainings to the members of the EDC to improve their skills in conducting PRA, implementing, monitoring and evaluation of eco-development activities.

**XIV. USUFRUCTUARY BENEFITS:**

**A. From Wildlife Protected Area :-**

- (i) Upon satisfaction of the PA management that collection and removal of certain items of forest products from identified zone(s) of a Protected Area is necessary for the improvement and management of wildlife therein, the Chief Wildlife Warden may grant permission for such collection and remove; Members of the EDC shall be eligible for getting in equal proportion such forest products free of royalty but on payment of collection cost, when collected by Govt. agency.
- (ii) The members of the E D C will have to protect and manage the Protected Area to the satisfaction of the PA management for a minimum period of one year to become eligible for 25% share Govt. receipts on account of tourist and transport entry and photography and such other related activities in the Protected Area.;
- (iii) Usufruct sharing, as mentioned above, will be subject to restrictions imposed from time to time on wildlife management and other related consideration.

**B. From Non- Forest Area :**

- (i) Produce obtained from plantations raised on public lands as village eco-development activity will be shared as follows:-
  - a. 100% share of intercrop to identified members of E D C who raised the crop(s);
  - b. 100% share of thinning produce & firewood obtained from final harvest to each member of EDC in equal proportion;
  - c. 100% share of firewood (obtained from drift and overwood removal) thatch/ grass (obtained from firelines and fire prone zones) specified non-edible fruits, pods, flowers, seeds decorative fungus and leaves;
  - d. The PA management shall deduct the cost of re-forestation from the sale value of final harvest to timber and poles for deposit in the EDC fund. Balance amount will be distributed to each member of the EDC in equal proportion.
- (ii) Goods services generated by community benefits oriented village eco-development activities will be enjoyed by each member of the EDC in equal proportion. Those generated by individuals benefit oriented eco-development activities will be enjoyed by the individual concerned.

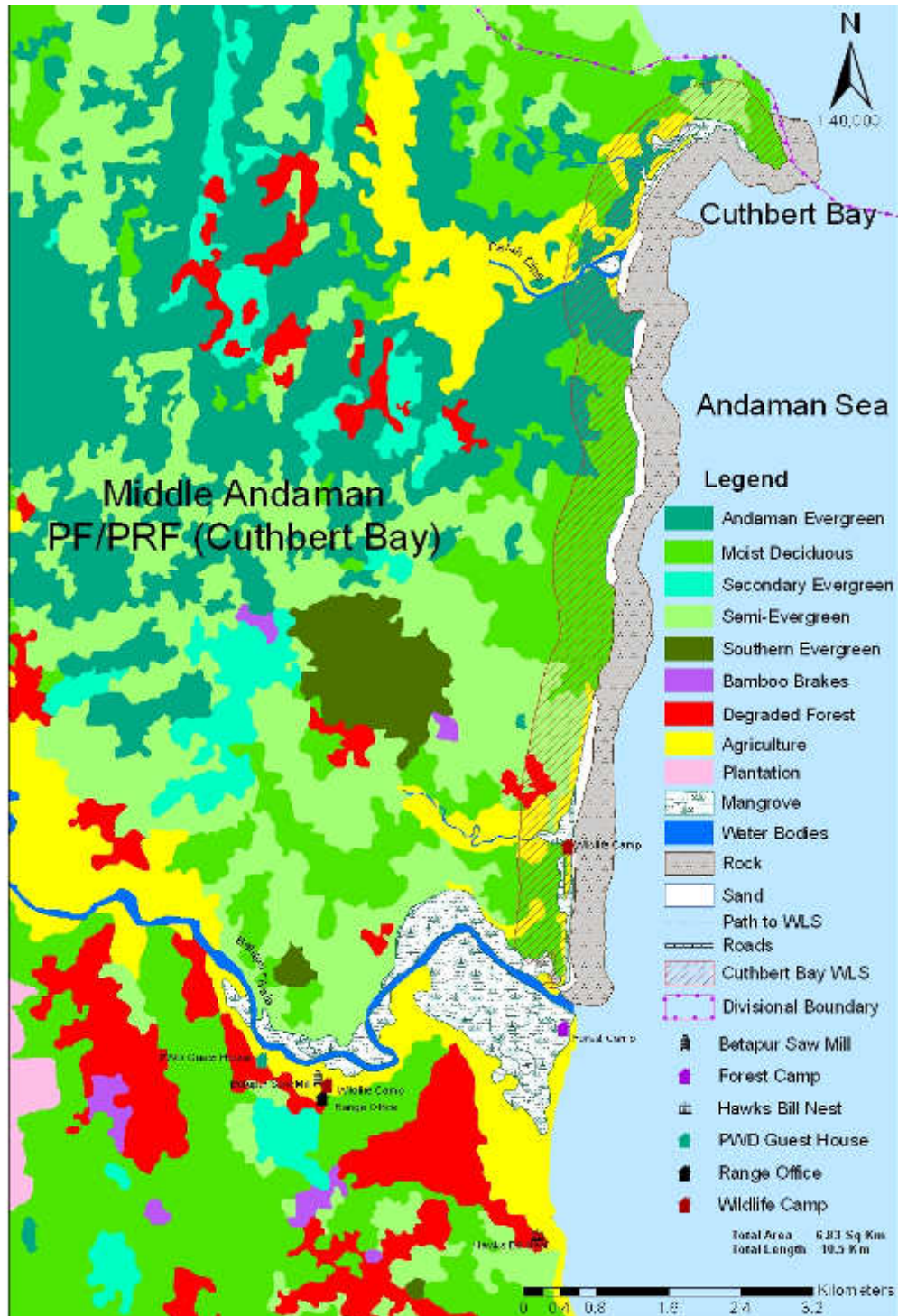
**XV. TERMINATION OF MEMBERSHIP, DISSOLUTION OF E.D.C. APPEAL, Etc.:**

- (i) Failure to comply with of the conditions laid down hereinbefore as well as contravention of provisions of the Indian Forest Act, 1927, Wildlife (Protection) Act, 1972 or any Rules made thereunder, may entail cancellation of individual membership by the EDC and/or dissolution of the EDC, as the case may be, by the officer of the Forest Department as stated in (ii) and (iii) below;
- (ii) The Forest Officer shall be entitled to take appropriate action including dissolution of any E.D.C. of the grounds stated above, as under;
- (iii) The EDC shall terminate the erring individual by passing a resolution on the abovementioned grounds. The appeal against such action shall be heard by DFO/ DCF concerned and the decision taken by the DFO/DCF shall be final binding on both parties;
- (iv) Appeal against dissolution of EDC by the DCF/ DFO concerned on the grounds of violation of MOU / irregularity may be referred to the concerned Circle Heads whose decision shall be final.

By order and in the name of the Lieutenant Governor,

Sd./-  
**(George Jacob)**  
Deputy Secretary  
(Environment & Forests)  
Andaman & Nicobar Administration

**Map Showing Forest Type of Cuthbert Bay Wildlife Sanctuary**



Map showing the Location of Post-78 Encroachers in Cuthbert Bay Wildlife Sanctuary



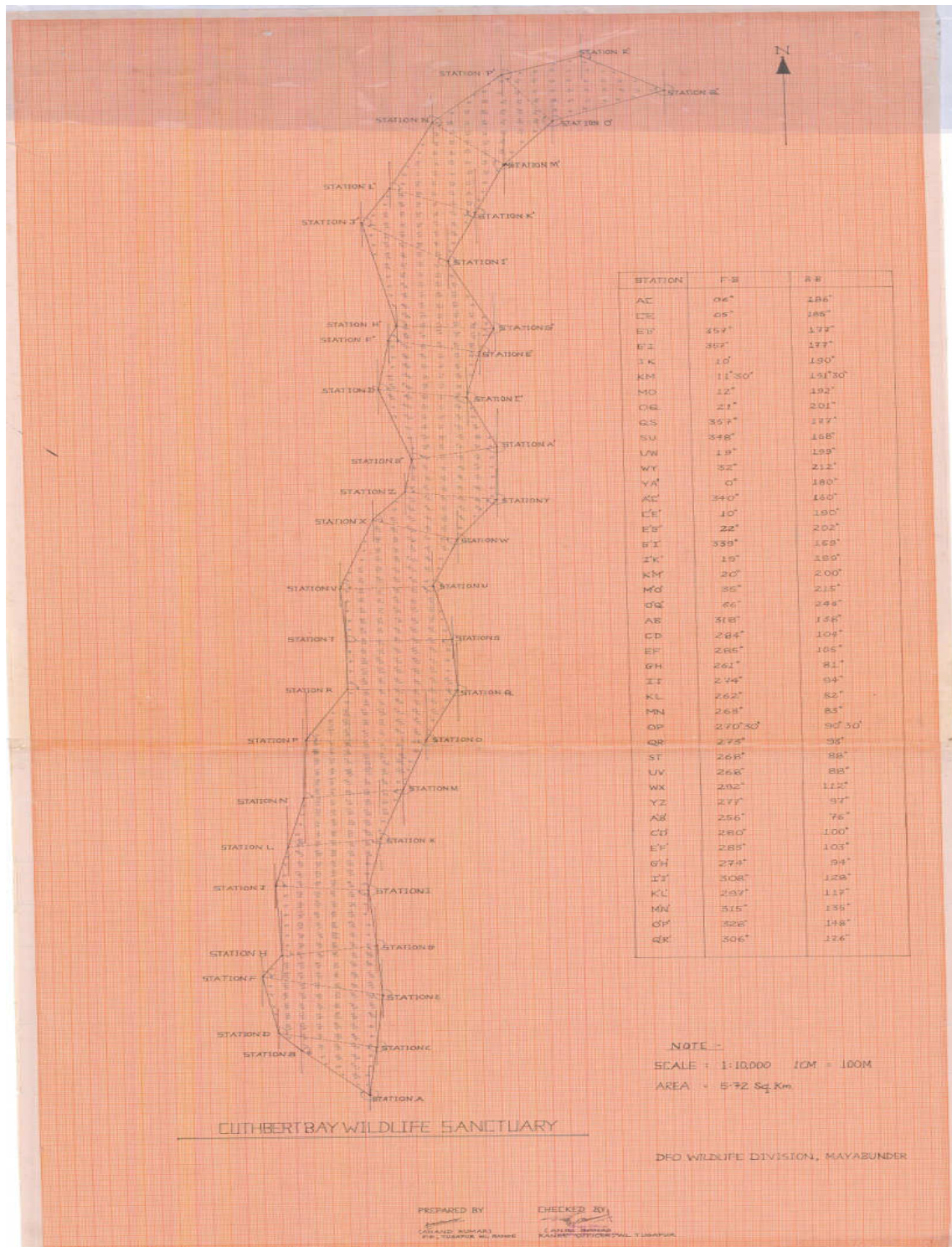
### Contour Map of Cuthbert Bay Wildlife Sanctuary



### GPS Locations of Cuthbert Bay Wildlife Sanctuary



Survey Sheet in respect of Boundary Survey of Cuthbert Bay Sanctuary



## Monthly Climate data for 2002-2014

## Monthly Climate Data for 2002

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	29.9	23.2	0.7	6.2	71	74
February	30.9	22.6	0.0	4.3	71	74
March	32.0	23.2	14.0	3.7	68	72
April	32.8	24.1	86.0	3.5	69	74
May	30.9	24.3	436.1	10.9	79	82
June	30.0	24.2	354.8	11.7	84	85
July	29.6	24.0	449.7	13.3	82	85
August	29.3	23.6	294.2	14.5	82	83
September	29.1	23.0	421.8	10.1	85	88
October	30.7	23.3	94.7	4.2	77	86
November	30.1	23.5	343.4	5.8	81	86
December	30.1	23.3	122.0	5.6	85	81

## Monthly Climate Data for 2003

Month/ Year	Temperature (Celcius)		Rainfall(mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	29.9	23.3	21.7	5.3	72	75
February	31.1	23.0	0.1	5.2	72	73
March	31.6	24.0	142.0	4.7	70	76
April	32.1	24.5	13.3	3.7	68	72
May	31.3	25.6	316.2	11.2	77	80
June	30.2	25.1	225.2	11.5	82	83
July	28.7	23.8	535.0	9.7	89	89
August	29.3	24.5	352.6	11.1	84	86
September	29.6	24.0	420.2	7.9	84	87
October	29.9	23.9	290.0	4.2	82	87
November	31.3	24.9	56.8	5.3	72	78
December	29.9	24.4	69.9	6.7	69	74

### Monthly Climate Data for 2004

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.5	24.3	104.2	6.7	71	76
February	30.3	22.7	25.9	4.5	69	70
March	31.7	23.3	1.0	2.8	67	72
April	33.5	25.0	33.7	4.3	66	70
May	30.3	24.6	662.8	8.9	83	86
June	29.4	24.6	601.3	11.3	84	88
July	29.4	24.1	401.0	10.2	83	85
August	29.3	24.6	362.9	12.1	84	86
September	29.7	24.0	431.0	6.0	83	86
October	30.2	24.2	270.3	5.5	80	84
November	31.0	24.8	294.6	5.5	75	79
December	30.4	24.2	0.0	6.6	65	69

### Monthly Climate Data for 2005

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.3	23.6	00	5.8	69.6	74.5
February	31.3	22.6	00	4.2	68.4	70.7
March	32.1	24.7	3.4	4.2	69.4	71.4
April	33.3	25.7	51.9	3.9	67.8	73.6
May	31.5	25.2	312.4	6.8	76.8	82.2
June	29.5	24.5	912.2	7.9	85.2	86.3
July	20.5	24.4	547.1	9.8	83.8	84.4
August	29.7	24.4	463.7	7.1	82.2	85.4
September	29.3	23.7	622.9	7.0	84.9	84.9
October	30.0	24.0	207.5	2.7	82.4	85.5
November	30.1	24.2	366.7	3.4	78.9	82.1
December	29.1	24.3	286.0	7.3	79.0	81.3

### Monthly Climate Data for 2006

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	29.9	22.9	3.6	5.8	70.1	72.6
February	31.1	24.3	1.9	4.9	71.6	71.2
March	30.5	23.7	0.9	2.4	70.1	69.2
April	31.9	24.3	149.9	3.7	67.9	74.5
May	30.9	23.6	403.8	8.4	78	83
June	29.7	23.8	486.2	9	89	91
July	29.9	25	177.3	14.2	85	87
August	29.5	24.5	314.1	13.7	84	86
September	23.8	23.2	791.7	7.5	90	93
October	29.9	23.8	561.4	7.8	83	87
November	30.7	24.9	79	8.8	75	80
December	30	23.5	34.4	9.9	71	76

### Monthly Climate Data for 2007

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30	22.7	0	9.5	72	75
February	30.8	22.9	0	8.2	67	72
March	31.4	22.2	0	5.1	65	72
April	32.6	25.3	40.7	5	69	75
May	30.46	24.7	274.2	11.4	83	85
June	30.3	24.7	402.9	9.2	84	87
July	29.6	24.9	281.6	16	84	86
August	29.2	24.7	489.1	13.4	86	88
September	28.7	23.9	473.2	10.5	87	91
October	29.7	23.9	320.9	8.5	85	88
November	30.1	23.9	263.8	8.2	79	82
December	29.9	23.5	9.6	9.7	72	75

### Monthly Climate Data for 2008

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.2	23.4	10.5	8.1	73	75
February	30.6	23.6	43	7.5	74	74
March	31.4	24.2	102.7	6.3	74	79
April	31.3	24	287.9	6.9	77	78
May	29.7	23.6	976	14.5	86	87
June	29.8	24.2	374.4	15.5	86	86
July	28.9	23.9	631	10.9	90	90
August	29.2	23.9	521.5	11.8	87	89
September	29.4	24	479.8	10.6	87	88
October	31	24.1	282.1	6.7	81	85
November	30.6	24.7	443	10.6	77	84
December	30.2	24.2	0.7	8	66	72

### Monthly Climate Data for 2009

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.1	23	0	6.875	65	70
February	31.5	22	0	3.785	66	68
March	32.7	24	27.2	3.87	70	76
April	32.5	26	157.4	8.935	74	80
May	31.4	25	405.1	8.125	84	86
June	29.1	25	505.4	13.7	90	90
July	29.9	25	178.8	13.405	87	87
August	30.3	25	418.5	10.765	86	87
September	27.8	25	416.2	12.7	83	83
October	31	24	237.6	5.905	81	88
November	31.5	25	88.6	6.27	74	80
December	31	25	61.9	6.42	72	79

### Monthly Climate Data for 2010

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.7	24	89.2	5.455	77	78
February	31.7	23	0	3.825	68	70
March	32.8	24	0	3.535	69	72
April	34.2	26	7	4.4	69	72
May	33.1	26	320.1	6.75	77	80
June	31.1	25	390.8	10.985	86	87
July	30	24	600.2	10.205	91	91
August	29.6	25	423	10	90	92
September	30.5	25	314.5	5.4	85	90
October	30.4	24	420.7	7.61	86	90
November	30.6	25	222.3	7.235	81	85
December	30.5	24	328.8	5.545	79	84

### Monthly Climate Data for 2011

Month/ Year	Temperature (Celcius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.4	24	132.1	7.195	77	81
February	31.1	23	77.4	7.75	78	78
March	30.6	24	456.2	7.58	80	83
April	32.1	25	54.2	4.9	75	80
May	31.9	25	409.3	10.665	82	86
June	30.4	25	510.4	18.285	88	90
July	29.6	24	6.7.6	15.355	91	91
August	29.6	24	535.2	13.77	91	94
September	29.2	24	643.6	12.87	93	94
October	31.2	25	150.7	9.325	83	89
November	32.5	25	71.4	9.065	72	79
December	30.4	25	240.6	11.68	77	80

### Monthly Climate Data for 2012

Month/ Year	Temperature (Celsius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	29.2	21.3	31	8.935	74	78
February	30.1	21.0	21	4.3	72	72
March	31.1	21.8	9	4.4	71	74
April	32.2	23.4	70	9.065	72	77
May	31.0	23.3	346	7.58	80	84
June	29.5	23.1	456	5.4	84	86
July	29.2	23.0	400	5.4	84	84
August	29.1	22.9	425	5.4	85	88
September	29.2	22.4	403	5.4	85	86
October	29.6	22.2	295	10.665	83	89
November	29.4	22.3	254	7.58	80	85
December	29.1	22.3	157	4.9	75	78

### Monthly Weather Data for 2013

Month/ Year	Temperature (Celsius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.6	24.0			75	78
February	32.0	25.0			74	78
March	33.0	24.0			67	71
April	34.1	25.0			69	74
May	32.2	25.0			81	86
June	29.4	25.0			93	91
July	29.1	24.0			92	91
August	30.3	25.0			88	88
September	29.3	24.0			92	93
October	30.9	24.0			83	88
November	30.8	25.0			78	86
December	29.9	24.0			70	74

### Monthly Weather Data for 2014

Month/ Year	Temperature (Celsius)		Rainfall (mm)	Wind Speed (km/hr)	Relative Humidity (%)	
	Mean Max	Mean Min			830 Hrs	1730 Hrs
January	30.0	24.0		11.5	66	70
February	30.6	23.0		6.0	70	73
March	32.5	24.0		6.5	67	71
April	34.3	25.0		2.5	64	69
May	32.3	26.0		4.0	78	82
June	30.6	26.0		13.5	84	88
July	29.8	25.0		15.0	88	88
August	30.1	25.0		10.5	85	87
September	30.0	24.0		9.0	85	89
October	30.5	25.0		1.0	82	87
November	30.8	25.0		4.5	78	83
December	31.0	26.0		10.0	73	77

**FLORA OF CUTBERT BAY WILDLIFE SANCTUARY**

<b>I.</b>	<b><u>COMMERCIAL</u></b>	
<b><u>I(A)</u></b>	<b><u>ORNAMENTAL WOODS</u></b>	
	<b>Vernacular Name</b>	<b>Scientific Name</b>
1.	Marble Wood	<i>Diospyros marmorata</i>
2.	Padauk	<i>Pterocarpus dalbergioides</i>
<b><u>I(B)</u></b>	<b><u>HARD WOOD</u></b>	
1.	Badam	<i>Terminalia procera</i>
2.	Black chuglum	<i>Terminalia manii</i>
3.	Gurjan	<i>Dipterocarpus species</i>
4.	Jhingam	<i>Pajenalia rhedii</i>
5.	Jungli aam	<i>Mangifera andamanica</i>
6.	Koko	<i>Albizia lebek</i>
7.	Lakuch	<i>Artocarpus gomeziana</i>
8.	Lal bombwe	<i>Planchonia andamanica</i>
9.	Lalchini	<i>Amoora vallivhi</i>
10.	Mau	<i>Duabanga soneratiodes</i>
11.	Nabbe	<i>Lennea grandis</i>
12.	Pyma	<i>Lagerstroemia hypoluca</i>
13.	Red thingam	<i>Prunus martabanica</i>
14.	Sea mohwa	<i>Manikara littoralis</i>
15.	Toungopinne	<i>Artocarpus chaplasha</i>
16.	White Chuglum	<i>Terminalia bialata</i>
17.	White thingam	<i>Hopea odorata</i>
<b><u>I(C)</u></b>	<b><u>SOFT WOOD</u></b>	
1.	Allanthua	<i>Ailanthus kurzii</i>
2.	Bakota	<i>Endospermum</i>
3.	Didu	<i>Bombax insignis</i>
4.	Papita	<i>Pterocymbium</i>

5.	White dhup	<i>Canarium euphyllum</i>
<b>II.</b>	<b><u>MISCELLANEOUS SPECIES</u></b>	
<b>II(A)</b>	<b><u>HARD WOOD</u></b>	
1.	Gular	<i>Ficus species</i>
2.	Jamun	<i>Schizigium species</i>
3.	Karanj	<i>Pongamia pinnata</i>
4.	Letauk	<i>Aglaia andamanica</i>
<b>II(B)</b>	<b><u>SOFT WOOD</u></b>	
1.	Bakri pathi	<i>Trema ambionensis</i>
2.	Jaiphal	<i>Myristica species</i>
3.	Kattaphal	<i>Baccaria sapida</i>
<b>II(C)</b>	<b><u>SHRUB</u></b>	
1.	Marripathi	<i>Caryota mitis</i>
<b>III.</b>	<b><u>MANGROVES</u></b>	
	<b>Scientific Name</b>	
1.	<i>Avicennia officinalis</i>	
2.	<i>Bruguiera cylindrical</i>	
3.	<i>Heritiera littoralis</i>	
4.	<i>Nypa fruticans</i>	
5.	<i>Phonenix paludosa</i>	
6.	<i>Rhizophora apiculata</i>	
7.	<i>Rhizophora mucronata</i>	
8.	<i>Sonneratia alba</i>	
9.	<i>Xylocarpus granatum</i>	

**FAUNA OF CUTBERT BAY WILDLIFE SANCTUARY**

S.No.	Common Name	Scientific Name	Sub-sp. name
	<b><u>MAMMALS:</u></b>		
1.	Himalayan Palm Civet	<i>Paguma larvata</i>	
2.	Small Indian Palm Civet	<i>Viverricula indica</i>	
3.	Spotted Deer	<i>Axis axis</i>	
	<b><u>BIRDS:</u></b>		
1.	Andaman Banded Crake	<i>Rallina canningi</i>	
2.	Andaman Black Woodpecker	<i>Dryocopus javensis</i>	<i>hodgei</i>
3.	Andaman Blacknaped Monrach	<i>Monarcha azurea</i>	<i>tyleri</i>
4.	Andaman carlet Minivet	<i>Pericrocotus flammeus</i>	<i>andamanensis</i>
5.	Andaman Chestnutheaded Bee eater	<i>Merops leschenaultia</i>	<i>andamanensis</i>
6.	Andaman Crow-Pheasant	<i>Centropus sinensis</i>	<i>andamanensis</i>
7.	Andaman Dark Serpent Eagle	<i>Spilomis elgini</i>	
8.	Andaman Emerald Dove	<i>Chalcophaps indica</i>	<i>maxima</i>
9.	Andaman Flowerpecker	<i>Dicaeum concolor</i>	<i>virescens</i>
10.	Andaman Glossy Stare	<i>Aplonis panayensis</i>	<i>lylleri</i>
11.	Andaman Green Imperial Pigeon	<i>Ducula aenea</i>	<i>andamanica</i>
12.	Andaman Greyrumped (or 'White-nest') Swiftlet	<i>Collocalia fuciphaga</i>	<i>inexpectata</i>
13.	Andaman Ground Thrush	<i>Zoothea citrina</i>	<i>andamanensis</i>
14.	Andaman Hill Myna	<i>Gracula religiosa</i>	<i>andamanensis</i>
15.	Andaman Koel	<i>Eudynamys scoiopacea</i>	<i>dolosa</i>
16.	Andaman Large Cuckoo-Shrike	<i>Coracina novaehollandiae</i>	<i>andamana</i>
17.	Andaman Magpie- Robin	<i>Copsychus saularis</i>	<i>andamanensis</i>
18.	Andaman Olivebacked sunbird	<i>Nectarinia jugularis</i>	<i>andamanica</i>
19.	Andaman Pompadour (Greyfronted Green Pigeon)	<i>Treron pompadora</i>	<i>chloroptera</i>

20.	Andaman Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	<i>otiosus</i>
21.	Andaman Red breasted Parakeet	<i>Psittacula alexandri</i>	<i>abbotti</i>
22.	Andaman Red Cheeked Parakeet	<i>Psittacula longicauda</i>	<i>tyleri</i>
23.	Andaman Red-Whiskered Bulbul	<i>Pycnonotus jocosus</i>	<i>whistleri</i>
24.	Andaman Ruddy Kingfisher	<i>Halcyon coramanda</i>	<i>mizorhina</i>
225.	Andaman Scops Owl	<i>Otus balli</i>	
26.	Andaman Shama	<i>Copsychus malabaricus</i>	<i>albiventris</i>
27.	Andaman Spotted breasted Pied .W.P.	<i>Picoides macei</i>	<i>andamanensis</i>
28.	Andaman Storkbilled Kingfisher	<i>Pelargopsis capensis</i>	<i>osmastoni</i>
29.	Andaman Tree Pie	<i>Dendrocitta bayleyi</i>	
30.	Andaman White Breasted Waterhen	<i>Amauromis phoenicurus</i>	<i>insularis</i>
31.	Andaman Whitebreasted Kingfisher	<i>Halcyon smymensis</i>	<i>saturatior</i>
32.	Andaman Whitecollared Kingfisher	<i>Halcyon chloris</i>	<i>davisoni</i>
33.	Andaman Wood pigeon	<i>Columba palumboides</i>	<i>palumboides</i>
34.	Blackcapped Kingfisher	<i>Halcyon pileata</i>	
35.	Brown Shrike	<i>Lanius cristatus</i>	<i>cristatus</i>
36.	(Large) Brownthroated Spinetail Swiftlet	<i>Chaetura gigantea</i>	<i>indica</i>
37.	Burmese Red Turtle-Dove	<i>Streptopelia tranquebarica</i>	<i>humilils</i>
38.	Cattle Egret	<i>Bubulcus ibis</i>	<i>coromandus</i>
39.	Common Sandpiper	<i>Actitis hypoleucos</i>	
40.	Curlew	<i>Numenius arquata</i>	<i>arquata</i>
41.	Eastern Blacknaped Tern	<i>Sterna sumatrana</i>	<i>sumatrana</i>
42.	Eastern Greenish Leaf Warbler	<i>Phylloscopus trochiloides</i>	<i>trochiloides</i>
43.	Eastern Jungle Crow	<i>Corvus macrorhynchus</i>	<i>levaillantii</i>
44.	Eastern Small Minivet	<i>Pericrocotus cinnamomeus</i>	<i>vividus</i>

45.	Fairy Bluebird	<i>Irena puella</i>	<i>puella</i>
46.	Forest Wagtail	<i>Motacilla indica</i>	
47.	Grey Wagtail	<i>Motacilla cinerea</i>	<i>cinerea</i>
48.	Indian Lorikeet	<i>Loriculus vernalis</i>	<i>vernalis</i>
49.	Large Andaman Parakeet	<i>Psittacula eupatria</i>	<i>magnirostris</i>
50.	Large Egret or Great White Heron	<i>Ardea alba</i>	<i>alba</i>
51.	Large Sand Plover	<i>Charadrius leschenaultii</i>	
52.	Lesser Sand Plover	<i>Charadrius mongolus</i>	<i>atrifrons</i>
53.	Lesser Whistling Teal or Tree Duck	<i>Dendrocygna javanica</i>	
54.	Little Egret	<i>Egretta garzetta</i>	<i>garzetta</i>
55.	Mangrove Whistler	<i>Pachycephala grisola</i>	
56.	Small Andaman Drongo	<i>Dicrurus andamanensis</i>	<i>andamanensis</i>
57.	Sooty Tern	<i>Stema fuscata</i>	<i>nubilosa</i>
58.	Whitebellied Sea Eagle	<i>Haliaeetus leucogaster</i>	
59.	Whitebellied Swiftlet	<i>Collocalia esculenta</i>	<i>affinis</i>
60.	Whiteheaded Myna	<i>Stumus erythropygius</i>	<i>andamanensis</i>
	<b><u>REPTILES:</u></b>		
	<b>A. Snakes:</b>		
1.	Andaman Krait	<i>Bungarus andamanensis</i>	
2.	Andaman Water Snake	<i>Xenochropis piscator andamanensis</i>	
3.	Anderson's Pit viper	<i>Trimersurus andersoni</i>	
4.	Banded Krait		
5.	King Cobra	<i>Ophiophamus hannah</i>	
6.	Rat Snake	<i>Ptyas mucosus</i>	
7.	Red-tailed Trinket Snake	<i>Elaphe oxycephala</i>	
	<b>B. Other Reptiles:</b>		
1.	Emerald Green Gecko	<i>Phelsuma andamanense</i>	
2.	Green Sea Turtle	<i>Chelonia mydas</i>	

3.	Hawks billed Turtle	<i>Eretmochelys imbricata</i>	
4.	Leather Back Turtle	<i>Dermochelys coreacea</i>	
5.	Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	
6.	Salt Water Crocodile	<i>Crocodylus porosus</i>	
7.	Water Monitor Lizard	<i>Varanus salvator</i>	

**LIST OF BUTTERFLIES OF CUTHBERT BAY SANCTUARY**

- |                               |   |   |
|-------------------------------|---|---|
| 1. Andaman Mine               | : | <i>Chilasa clytia flavolimbtus</i>          |
| 2. Andaman Orange Tip         | : | <i>Ixias pyrene andamana</i>                |
| 3. Andaman Great Orange Tip   | : | <i>Hebomoia glaucippe roepstorffii</i>      |
| 4. Andaman Crow               | : | <i>Euploea a. andamanensis</i>              |
| 5. Andaman Duffer             | : | <i>Discophora Continentalis andamanesis</i> |
| 6. Andaman Banded Dandy       | : | <i>Laringa horsfieldii andamanesis</i>      |
| 7. Andaman Centaur Oak blue   | : | <i>Arhopala centaurus coruscans</i>         |
| 8. Andaman Tit                | : | <i>Hypolycaena erylus andamana.</i>         |
| 9. Andaman White Cerulean     | : | <i>Jamides celeno blairana</i>              |
| 10. Andaman Large 4 line blue | : | <i>Nacaduba pactolus andamanica.</i>        |
| 11. Andaman sunbeam           | : | <i>Curetes saronis saronis</i>              |
| 12. Island Common Snow Flat   | : | <i>Tagiades atticus ravina</i>              |
| 13. Andaman Giant Redeye      | : | <i>Gangara thyrsis yasodara</i>             |
| 14. Andaman Dark Tropic Dart  | : | <i>Potanthus tropical nina</i>              |

## YEARWISE DATA FOR TURTLE NESTING AT CUTHBERT BAY SANCTUARY FROM 1999-2000 TO 2006-07

		Nesting Details															
		1999-2000		2000-01		2001-02		2002-03		2003-04		2004-05		2005-06		2006-07	
Sl. No.	Species of Turtles	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid
1.	Olive Ridley	194	34643	112	3724	467	3453	159	18387	305	34485	51	5914	91	11049	193	22888
2.	Green Sea	12	1052	04	-	10	02	05	568	13	1268	01	149	06	344	-	-
3.	Leather Back	02	221	09	-	05	02	01	51	13	1239	-	-	-	-	-	-
	<b>Total</b>	<b>208</b>	<b>35916</b>	<b>125</b>	<b>3724</b>	<b>482</b>	<b>3453</b>	<b>165</b>	<b>19006</b>	<b>331</b>	<b>36992</b>	<b>52</b>	<b>6063</b>	<b>97</b>	<b>11393</b>	<b>193</b>	<b>22888</b>

**YEARWISE DATA FOR TURTLE HATCHLINGS RELEASED AT CUTHBERT BAY SANCTUARY FROM 1999-00 TO 2006-07**

		Turtle Hatchlings details															
		1999-2000		2000-01		2001-02		2002-03		2003-04		2004-05		2005-06		2006-07	
S.No.	Species	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released	Nest hatched out	Hatchlings released
1.	Olive Ridley	-	1813	-	-	-	-	159	15525	305	23700	36	3430	86	6946	148	16587
2.	Green Sea	-	-	-	-	-	-	05	492	13	913	-	-	4	235	-	-
3.	Leather Back	-	-	-	-	-	-	-	-	13	1032	-	-	-	-	-	-
	<b>Total</b>	<b>-</b>	<b>1813</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>164</b>	<b>16017</b>	<b>331</b>	<b>25645</b>	<b>36</b>	<b>3430</b>	<b>90</b>	<b>7181</b>	<b>148</b>	<b>16587</b>

**YEARWISE DATA FOR TURTLE NESTING AT CUTHBERT BAY SANCTUARY FROM 2007-08 TO 2011-12**

Sl. No.	Species of turtle	Year wise details of Turtle Nesting									
		2007-08		2008-09		2009-10		2010-11		2011-12	
		No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid	No. of Nesting	No. of eggs laid
1.	Olive Ridley	491	56165	288	31884	388	4244	351	40233	221	24228
2.	Green Sea	08	733	04	470	06	634	04	457	08	734
3.	Leather Back	-	-	02	253	-	-	04	414	-	-
4.	Hawks Bill	-	-	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>499</b>	<b>56898</b>	<b>294</b>	<b>32607</b>	<b>394</b>	<b>43078</b>	<b>359</b>	<b>41104</b>	<b>229</b>	<b>24962</b>

**YEARWISE DATA FOR TURTLE HATCHLINGS RELEASED AT CUTHBERT BAY SANCTUARY FROM 2007-08 TO 2011-12**

		<b>HATCHLINGS DETAILS</b>									
		<b>2007-08</b>		<b>2008-09</b>		<b>2009-10</b>		<b>2010-11</b>		<b>2011-12</b>	
<b>Sl. No.</b>	<b>Species of Turtles</b>	<b>No. of Nest hatched out</b>	<b>No. of Hatchlings released</b>	<b>No. of Nest hatched out</b>	<b>No. of Hatchlings released.</b>	<b>No. of Nest hatched out</b>	<b>No. of Hatchlings released.</b>	<b>No. of Nest hatched out</b>	<b>No. of Hatchlings released.</b>	<b>No. of Nest hatched out</b>	<b>No. of Hatchlings released.</b>
1.	Olive Ridley	218	19029	147	16423	198	21951	228	20595	131	14415
2.	Green Sea	05	406	01	145	02	273	-	-	03	230
3.	Leather Back	-	-	02	248	-	-	-	283	-	-
4.	Hawks Bill	-	-	-	-	-	-	03	-	-	-
	<b>Total</b>	<b>223</b>	<b>19435</b>	<b>150</b>	<b>16816</b>	<b>200</b>	<b>22224</b>	<b>231</b>	<b>20878</b>	<b>134</b>	<b>14645</b>

**Year wise Tourist Visiting in Cuthbert Bay Sanctuary**

S. No	Year	No. of Tourist Visited
1	2008	Nil
2	2009	31
3.	2010	06
4.	2011	31
5	2012	Nil

**Nest data Sheet**

Turtle Species .....Tag number (if any).....

Date and time laid.....

**Nesting Site**

Nest location along beach .....

Distance from HTL.....

Nest depth top.....Nest depth bottom.....

**Clutch size**

Egg diameter (cm) : (1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

Egg weight (gm) : (1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

**Nest Contents/Excavation Data**

- E = Emerged
- S = Hatched out shells
- LIN = Live in Nest
- DIN = Dead in Nest
- LPE = Live hatchling in pipped shell
- DPE = Dead hatchling in pipped shell

**Unhatched eggs :**

- UD = Undeveloped eggs with no obvious embryo
- UH = Unhatched eggs with obvious embryo
- UHT = Unhatched full term embryo
- P = Predated

**BEACH DATA**

**Beach profile**

1	Date of Survey	
2	Beach Name	
3	Length of Beach	
4	Width of Transect	
5	Length of Transect	
6	Data for each Transect	
7	GPS coordinates of the Beach	
8	Width of the Beach	
9	Sand Texture	Fine/Medium/Coarse
10	Beach is backed by	Natural vegetation/Casuarina plantation/ Habitation dunes/ road/ village/town/other
11	No. of village	
12	Threats	
13	Lighting Disturbance	
14	Intensity	Absent/Low/Medium/High
15	Source	Industry/Village/Town/other
16	Plantations	Yes/No
17	Sand mining	Yes/No
18	Beach armouring	Yes/No
19	Remark	





**The details of the encroachers encroached on the Cuthbert Bay Sanctuary area as per the records collected from Camp Officer (WL) Cuthbert Bay**

S.No.	Name of the Encroachers	Area encroached (in Hect.)	Type of structure and occupation in the encroached land.	Location pocket with GPS readings	Present status of Evicted land	Remarks
1.	Shri Manoranjan Das S/o Ananda kumar Das	01 Hect.	Semi-permanent hut adjoining land used for cultivation purpose	Cuthbert Bay N 12°41'59.3" E 92°57'41.6"	-	Post 78 Encroachers
2.	Shri Ranjit Das s/o Jatin Das	01 Hect.	- do -	Cuthbert Bay N 12°42'02.9" E 92°57'41.3"	-	
3.	Shri Subankar Das s/o Hera lal Das	01.50 Hect.	- do -	Cuthbert Bay N 12°42'02.8" E 92°57'45.4"	-	
4.	Shri Jathin Das s/o Bipin Chandra Das	01 Hect.	- do -	Cuthbert Bay N 12°42'29.8" E 92°57'44.8"	-	
5.	Shri Sameer Das s/o Heera lal Das	01 Hect.	- do -	Cuthbert Bay N 12°42'01.7" E 92°57'37.9"	-	
6.	Smti Basanti Sarpan w/o Navo kumar Sarpan	01 Hect.	- do -	Cuthbert Bay N 12°42'11.0" E 92°57'34.1"	-	
7.	Shri Nanigopal Sarpan s/o N.N. Sarpan	01 Hect.	- do -	Cuthbert Bay N 12°41'56.7" E 92°57'09.1"	-	
8.	Shri Rakhil Gharami s/o Harolal Gharami	0.50 Hect.	- do -	Cuthbert Bay N 12°41'55.3" E 92°57'29.1"	-	
9.	Shri Samiron Mondal S/o Satish Mondal	01.50 Hect.	- do -	Cuthbert Bay N 12°42'08.8" E 92°57'38.2"	-	
10	Shri Nepal Das S/o Manoranjan Das	0.50 Hect.	- do -	Cuthbert Bay N 12°42'07.7" E 92°57'24.1"	-	

11	Shri Biren Roy s/o Gitendra Roy	01.70 Hect.	- do -	Cuthbert Bay N 12°42'44.1" E 92°58'02.1"	-	Post 78 Encroachers
12	Shri Subal Biswas s/o Tailakhya Biswas	01 Hect.	- do -	Cuthbert Bay N 12°42'37.5" E 92°57'44.8"	-	
13	Shri Nilkanto Roy s/o Rajendro Roy	0.50 Hect.	- do -	Cuthbert Bay N 12°42'07.0" E 92°57'36.0"	-	
14	Shri Chittrangan Garami s/o Basiram Garami	01 Hect.	- do -	Cuthbert Bay N 12°42'38.3" E 92°57'49.0"	-	
15	Shri Bimal Mistry s/o Gopal Mistry	01.70 Hect.	- do -	Cuthbert Bay N 12°42'27.5" E 92°57'46.0"	-	
16	Shri Prabash Mondal s/o Nihar Mondal	01 Hect.	- do -	Cuthbert Bay N 12°42'27.2" E 92°57'46.9"	-	
17	Shri Radhanath Maji s/o Baldev Maji	0.50 Hect.	- do -	Cuthbert Bay N 12°42'43.9" E 92°57'59.5"	-	
18	Shri Mani Ram Biswas s/o Tarak Biswas	01 Hect.	- do -	Cuthbert Bay N 12°42'41.0" E 92°57'53.9"	-	
19	Shri Sachin Bairagi s/o Budumanto Bairagi	0.50 Hect.	- do -	Cuthbert Bay N 12°42'46.4" E 92°58'07.1"	-	
20	Shri Paritosh Sarkar s/o A. K Sarkar	01 Hect.	No structure remaining	Cuthbert Bay N 12°41'45.6" E 92°57'28.9"	Vacated land presently	
21	Shri Ramesh Gain s/o Sheetal Gain	01.50 Hect.	No structure remaining	Cuthbert Bay N 12°41'47.4" E 92°57'25.3"	Vacated land presently	
22	Shri Ranjit Bepari s/o Ramesh Bepari	01.30 Hect.	- do -	Cuthbert Bay N 12°42'05.1" E 92°57'39.5"	Vacated land presently	
23	Shri Radeshyam Mistri s/o Milar Mistri	0.50 Hect.	- do -	Cuthbert Bay N 12°42'09.0" E 92°57'25.7"	Vacated land presently	
24	Shri Kumod Mondal s/o Ajit Mondal	01 Hect.	- do -	Cuthbert Bay N 12°42'01.2" E 92°57'28.0"	Vacated land presently	

25	Shri Nilrathan Tikedar s/o Raril lal Tikedar	0.50 Hect.	- do -	Cuthbert Bay N 12°42'11.1" E 92°57'30.9"	Vacated land presently	
26	Shri Shribash Roy s/o Shanti Roy	01 Hect.	- do -	Dhani Nallah N 12°42'10.3" E 92°57'29.8"	Vacated land presently	
27	Smti Mariyam kandulna w/o Philip Bage	0.50 Hect.	Semi permanent hut adjoining land used for cultivation purpose	Dhani Nallah N 12°38'15.0" E 92°57'18.3"	-	
28	Shri Lazarus Minj s/o Markus Minj	0.50 Hect.	- do -	Dhani Nallah N 12°38'33.0" E 92°57'16.2"	-	
29	Shri Isdor Kerketta s/o John Kerketta	01 Hect.	No structure remaining	Dhani Nallah N 12°38'29.7" E 92°57'16.5"	Vacated land presently	Post 78 Encroac hers
30	Shri Kristena Kullu w/o Piter Kandulna	0.50 Hect.	- do -	Dhani Nallah N 12°38'28.5" E 92°57'15.4"	Vacated land presently	
31	Shri Harikanto Promanik s/o S.C Pramanik	01 Hect.	Semi permanent hut adjoining land used for cultivation purpose	Dhani Nallah N 12°37'54.0" E 92°57'16.8"	-	
32	Miss Susma Kandula d/o Barnabas Kandula	01 Hect.	No structure remaining	Dhani Nallah N 12°32'21.2" E 92°57'15.5"	Vacated land presently	
33	Shri Rafel Dung Dung	01 Hect.	No structure remaining	Dhani Nallah N 12°38'28.8" E 92°57'17.5"	Vacated land presently	
34	Shri Joakim Toppo	01 Hect.	No structure remaining	Dhani Nallah N 12°38'21.1" E 92°57'15.9"	Vacated land presently	

**PROTECTION DUTY PROFORMA**

**RANGE** : Beat/Camp :

Name of staff : Designation :

1. Date of patrolling :

2. Duration of patrolling :

3. Area covers :

4. Offence detected :

5. Wildlife species observed :

6. Observation on habitat :

(i) Incidence/signs of grazing

(ii) Signs of tree/pole up rooting

(iii) Sign of MFP removal

7. Other Remarks



Fig1: Cuthbert Bay beach (Nesting site)



Fig. 2 : Hatchery at Cuthbert Bay (WL) Sanctuary



Fig 3: Hatchery at Cuthbert Bay (WL) Sanctuary



Fig 4: Turtle nesting at Cuthbert Bay (WL) Sanctuary



Fig 5: Turtle nesting at Cuthbert Bay (WL) Sanctuary



Fig 6: Turtle Hatchling released at Cuthbert Bay (WL) Sanctuary



Fig. 7 Invasion of Casuarina towards sea



Fig 8 Information hut at Cuthbert Bay Sanctuary